DOCUMENT RESUME

ED 093 637 SE 017 213

TITLE	Populations. Basic Edition. Science for Micronesia.
INSTITUTION	Trust Territory of the Pacific Islands Dept. of Education, Saipan.
SPONS AGENCY	Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
PUB DATE	Mar 73
NOTE	132p.; See SE 017 211-214 for other units
EDRS PRICE	MF-$0.75 HC-$6.60 PLUS POSTAGE
DESCRIPTORS	Biology; Curriculum; *Elementary School Science; *Environmental Education; Grade 3; *Population Education; *Population Growth; Science Activities; Science Course Improvement Project; Science Education; *Teaching Guides
IDENTIFIERS	Elementary Secondary Education Act Title III; ESEA Title III; Micronesia

ABSTRACT

This teacher's guide is for an elementary school science unit designed for use with third grade (or older) children in the Trust Territory of Micronesia. Although there is a degree of similarity to curriculum materials developed for the Science Curriculum Improvement Study, this Micronesian unit does not purport to be an adaptation or edition of the SCIS materials. Designed to be taught in the vernacular language, is recommended the unit be taught in conjunction with the unit on systems and variables, with these two units occupying the school year. The activities are designed for active student involvement with the teacher acting as a guide. The unit involves the concepts of populations, predator, prey, community, plant eater, animal eater, food chain, and food web and the science process skills of observing, communicating, predicting, inferring, and recording. The guide contains information concerning objectives, teacher and student activities, rationale for these activities, needed materials, teaching suggestions (provided on a day by day basis), and questions to be posed in class discussions. (PEB)

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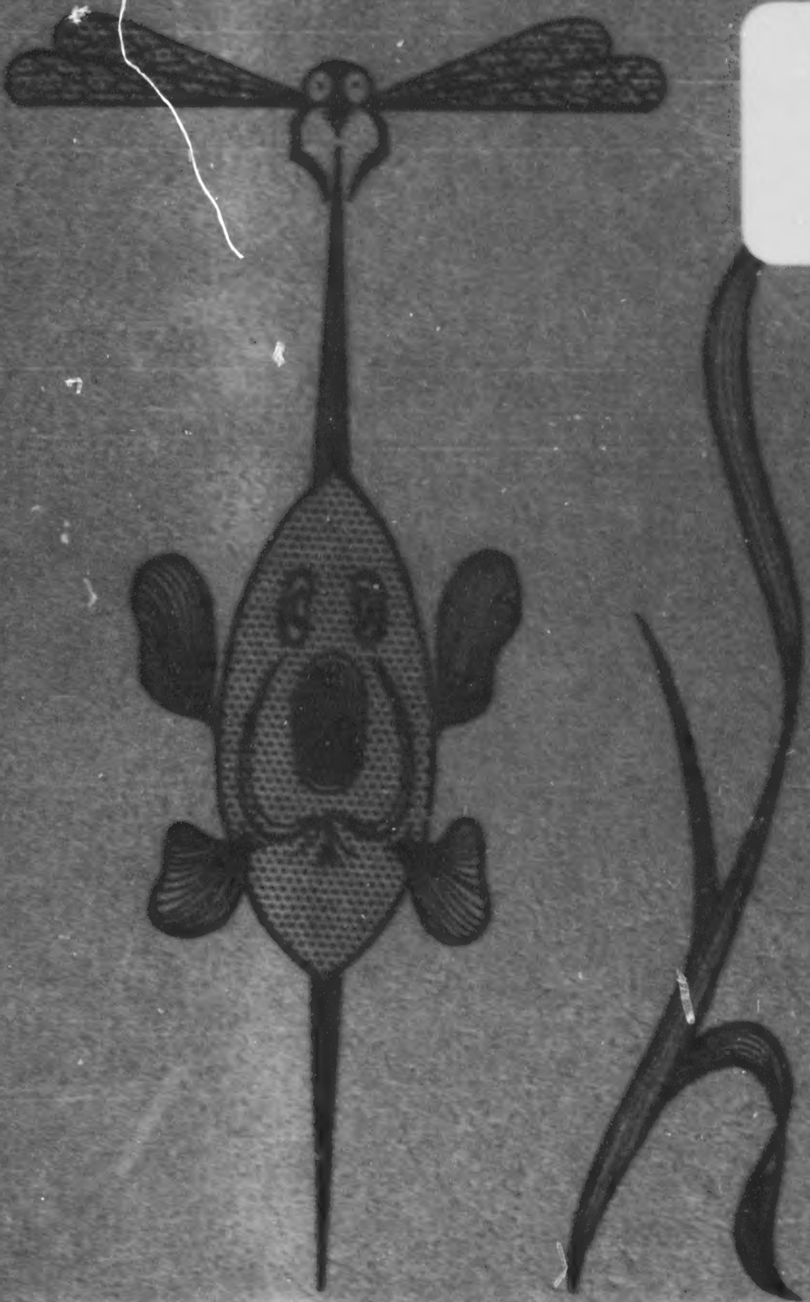
POPULATIONS

BASIC EDITION



SCIENCE FOR MICRONESIA

SE017 213

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The compilers and editors gratefully acknowledge the encouragement and cooperation of the Science Curriculum Improvement Study staff at the University of California, Berkeley, in the preparation of this unit.

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This unit was produced by the "Elementary Science Improvement Project", a project funded under Title III of the Elementary and Secondary Education Act, with funds granted by the U. S. Office of Education to the Trust Territory of the Pacific Islands, Department of Education. Opinions expressed herein are those of the Trust Territory personnel who worked on the unit; no official endorsement by funding agencies should be inferred.

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"SCIENCE FOR MICRONESIA"

POPULATIONS - Basic Edition

The teaching concepts utilized in this unit have been adapted from similar programs currently in use in the United States, Africa and other areas of the world. This unit has been adapted for use here by teachers and science educators in the Trust Territory who have considered the local environment, language, educational structure, local materials and culture.

It has gone through the following process:

1. Adaptation for experimental use done by Educ. Spec./Science - T. T. Printed in August 1971.

2. Experimental teaching done in all third grades in Marianas District during the school year 1971-72. Micronesian teachers and Peace Corps Science Co-teachers did the experimental teaching under the coordination of the Marianas District Trial Center, Marianas District Education/Science Department.

3. Trial Edition printed in May 1972 as a result of the feedback obtained from the experimental teaching.

4. Unit used in pilot classes in all districts from Sept. 72 through Jan. 73. Feedback on the unit was gathered at the Feb. 73 Trust Territory wide science conference.

5. Basic Edition printed in March 1973. Rewritten and printed under the coordination of the Curriculum Task Force as part of the E. S. E. A., Title III "Elementary Science Improvement Project".

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WORDS FOR THE TEACHER ABOUT POPULATIONS

What grade is it to be used at? It is designed to be used in the third grade, but it could be used in any of the upper grades.

What language should be used to teach it? Most of the lesson should be taught in the vernacular. You will have to use some English words like "population" and others not found in the vernacular.

How long will this unit ("Populations") take? If you use this unit with the unit "Systems and Variables" it will be enough material for more than a school year. You should use the two units ("Systems and Variables" and "Populations" so that you do one unit for a while and then switch back to the other unit. For example: start the duckweed experiment in "Populations" and then do some activities from "Systems and Variables" while you are waiting for the duckweed to change.

You may do the unit "Populations" before you start on any other unit if that is the way you want to do it. The choice is up to you. The unit "Populations" should take over half a year to complete.

What kind of science is this? In this science program the children do science activities. We call this "sciencing". Instead of "reading about" science the children "do" science.

What does the teacher do in class? The teacher should act as a guide. You should guide the students to find answers themselves instead of telling them the answers. To be a good guide the teacher must: ask inquiry type questions, listen to the students, let the students find their own answers.

How fast should the activities be done in class? The unit gives some suggestions for time. Many activities will take more time than suggested if the students are interested in doing other things having to do with the activity. Don't rush the students. It is better to do the activity well than to rush through it.

Does this unit, "Populations", have special things it teaches? Yes, the activities in the unit are designed to let the children do activities that develop the big ideas (concepts) of:

populations
predator
prey
community
plant eater
animal eater
food chain
food web

This unit also gives the children opportunities to develop skills that are used in sciencing. For example the skills of: observing, communicating, predicting, inferring and recording.

Is there any connection between "Populations" and "Systems And Variables"? Yes, they both develop the same skills and are concerned with CHANGE. This CHANGE can be seen as an increase in population or as a result of a variable.

How do I evaluate the students in the class? The education department will give you "narrative evaluation" forms to use. On these forms you can evaluate how your students are doing in many different areas.

Is this kind of science harder to teach? You must be prepared. It will be harder if you do not know what you are doing. To prepare the teacher, workshops are given and these units are written to make the teaching directions easy to understand.

Instead of using your time grading papers, and making tests and filling out lesson plans you will now use it in preparing materials. It should not take any more time than with the old science program, if you were properly prepared when you taught the old science program.

It should be easier to plan for because the units are lesson plans that tell you what to do and what materials you need to do it.

It should be easier to teach because you will be supplied with most of the materials needed for the lessons.

It should be easier to teach because it is interesting to you and the children.

The hardest part of teaching this kind of science is for you to learn to be a guide instead of always telling and showing.

What about the materials? Most of the materials will be given to you at the beginning of the school year. Some materials will have to be collected by the students or by the teacher.

The teacher gets the materials by asking the Science Program Area at District Education. When you have the materials you are responsible for them and will be expected to pay for any that are lost.

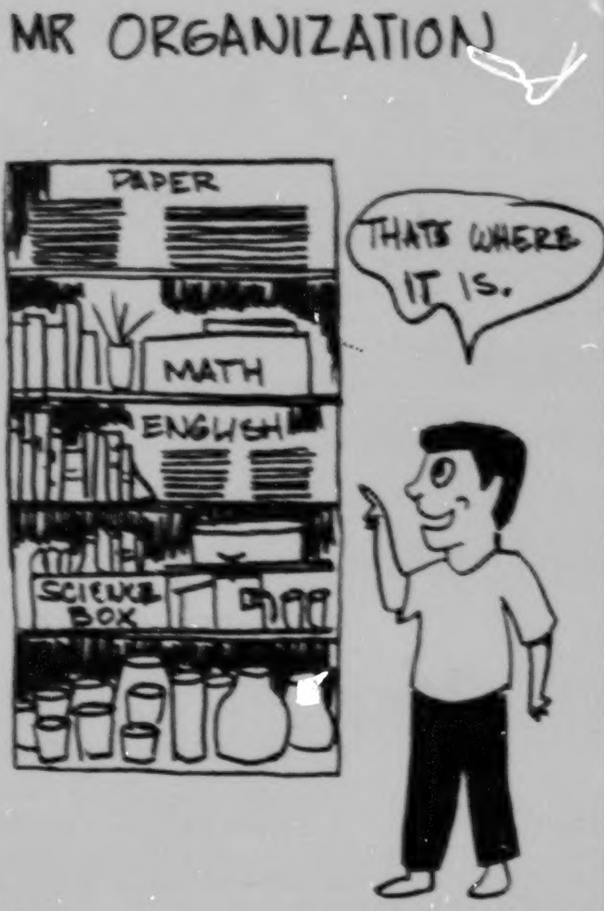
Is this kind of science used anywhere else? Yes, the teaching concepts used in this unit were adapted from similar programs now used in the United States, Africa, Papua and other areas of the world. This unit has been adapted for use here by teachers and science educators in the Trust Territory. They have considered the local environment, language, educational structure, local materials, and culture. The program is now being used in all of the districts in some way. All teachers who now graduate from the Community College of Micronesia are prepared to teach "Science For Micronesia".

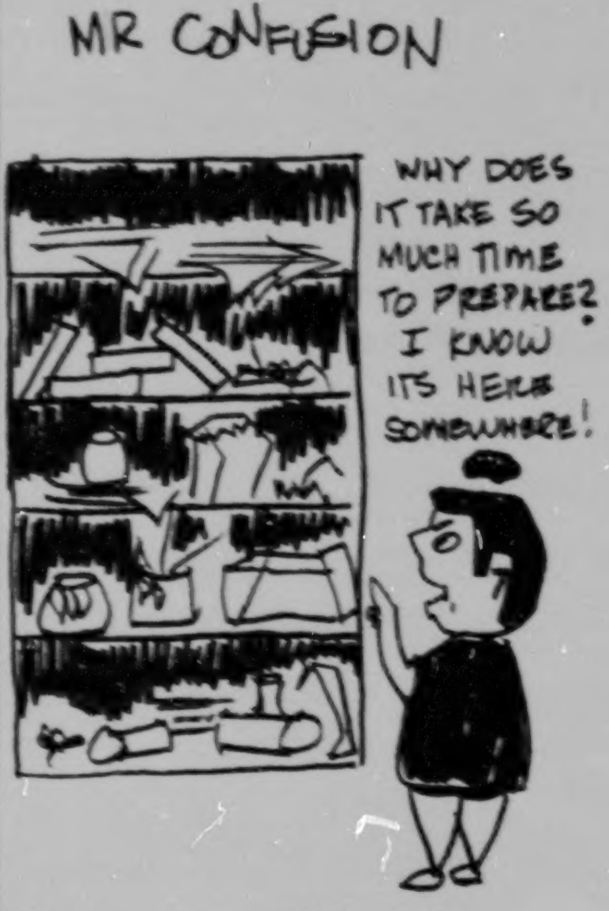
How does this unit, "Populations", fit with the other units?

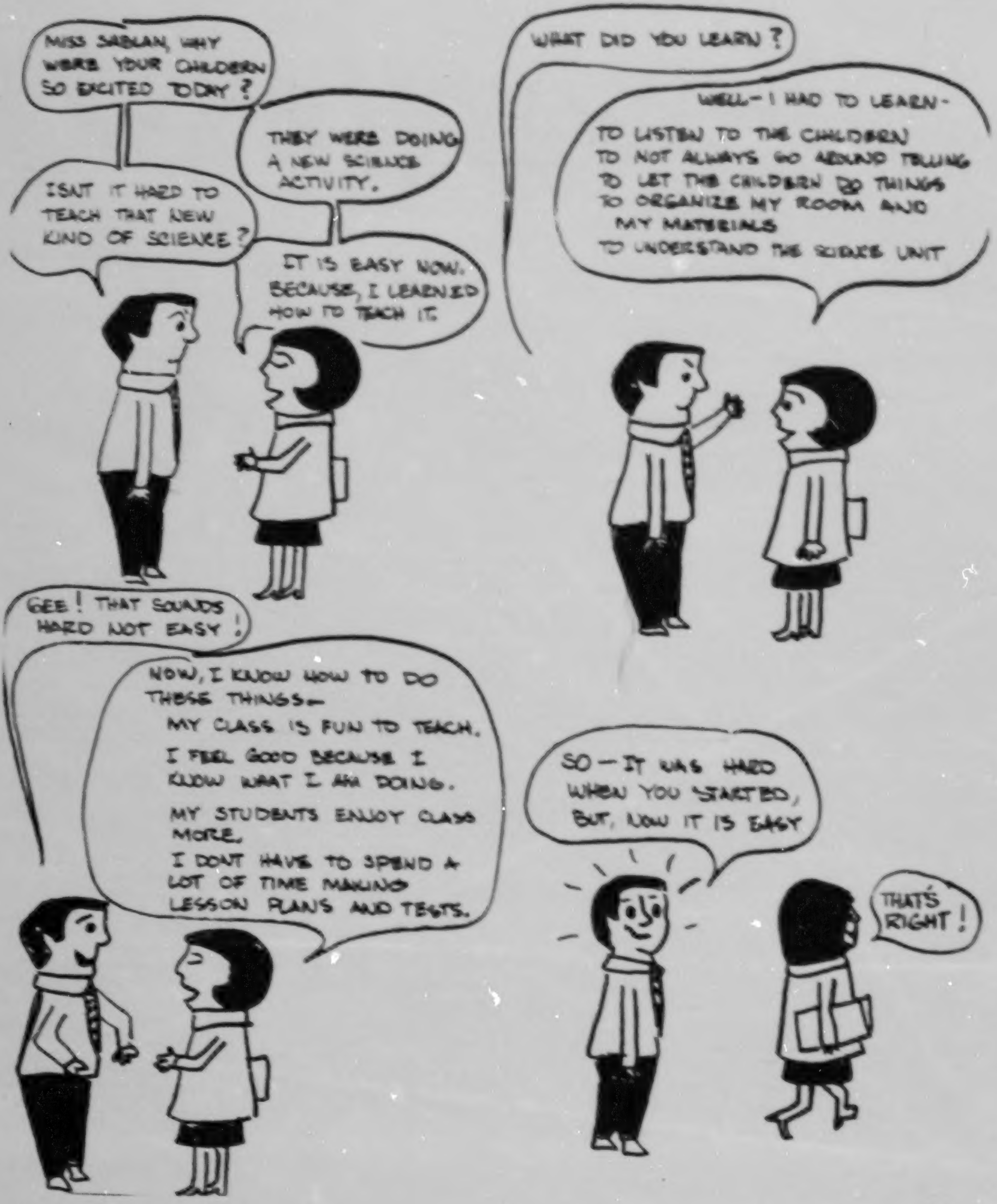
Below is a diagram showing all the units in grades one through six.

SCIENCE FOR MICRONESIA

PHYSICAL SCIENCE UNITS	LIFE SCIENCE UNITS
Material Objects	Organisms
Interaction and Systems	Life Cycles
Systems And Variables	Populations
Relative Position And Motion	Enviroments
Energy Sources	Communities
Models: Electrical And Magnetic Interaction	Ecosystems


MR ORGANIZATION
PAPER
MATH
ENGLISH
SCIENCE BOX
THATS WHERE IT IS.


MR CONFUSION
WHY DOES IT TAKE SO MUCH TIME TO PREPARE? I KNOW ITS HERE SOMEWHERE!


MISS SABLAN, WHY WERE YOUR CHILDREN SO EXCITED TODAY?
THEY WERE DOING A NEW SCIENCE ACTIVITY.
ISNT IT HARD TO TEACH THAT NEW KIND OF SCIENCE?
IT IS EASY NOW. BECAUSE, I LEARNED HOW TO TEACH IT.
WHAT DID YOU LEARN?
WELL- I HAD TO LEARN- TO LISTEN TO THE CHILDREN TO NOT ALWAYS GO AROUND TELLING TO LET THE CHILDREN DO THINGS TO ORGANIZE MY ROOM AND MY MATERIALS TO UNDERSTAND THE SCIENCE UNIT
GEE! THAT SOUNDS HARD NOT EASY!
NOW, I KNOW HOW TO DO THESE THINGS— MY CLASS IS FUN TO TEACH. I FEEL GOOD BECAUSE I KNOW WHAT I AM DOING. MY STUDENTS ENJOY CLASS MORE. I DONT HAVE TO SPEND A LOT OF TIME MAKING LESSON PLANS AND TESTS.
SO — IT WAS HARD WHEN YOU STARTED, BUT, NOW IT IS EASY
THAT'S RIGHT!

PART 1

FRESHWATER POPULATIONS

OBJECTIVES (WHERE PART ONE IS GOING)

At the end of Part One the children should be able to:

- Understand the word population and use it refer to a group of plants or animals of one kind in a particular area.
- Identify populations of organisms around the school.
- Recognize that the size of a population can increase or decrease because of environmental conditions.
- Suggest and do experiments that might help answer questions.

NOTE: ACTIVITY 1A is the same as this activity, but it uses saltwater and saltwater organisms. If you cannot do ACTIVITY 1, do ACTIVITY 1A.

ACTIVITY 1 SETTING UP AND OBSERVING FRESHWATER AQUARIUMS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children are divided into small groups. Each group sets up an aquarium. The children add different kinds of plants and animals (populations). They observe the aquariums for change.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

As the children set up and observe the aquariums, they get actual experience with several populations of organisms. They get practice in describing the changes and activities they observe in the aquariums. Organisms in the aquariums will be used for later activities in this unit. The important thing in this activity is to look for changes.

MATERIALS

For each group of four children:

- aquarium or large jar
- four magnifiers
- four sheets of paper for aquarium records
- jar to collect organisms in on the field trip
- freshwater snails
- mosquito fish
- duckweed
- local water plants
- small rock with algae on it

These will be collected on the field trip on the Third Day. You may substitute other freshwater organisms if these are not on your island.

For the class:

- small dip net
- two aquariums for extra use
- large net (optional)
- fine gravel or sand (must be washed if you get it from the beach)
- masking tape
- rainwater or tap water

PREPARATION

1. On the third day of this activity you go on a field trip to collect organisms. Do the following: Turn to page 110 and read "How To Take A Field Trip".

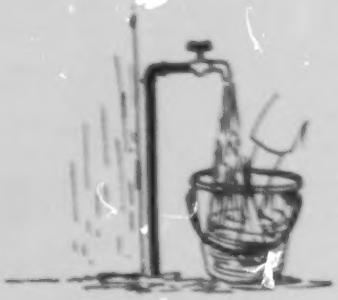
   Look at page 130 and read "Where To Find Organisms On This Island".

If you need transportation, arrange for it a week ahead of the day of the field trip. If the place you are going is private land, get permission from the other before the day of the trip.

2. You will need sand or gravel for the aquariums. Get it now or let the students get it on the first day of the activity.

If you get the sand or gravel from the beach, you should wash the salt out of it.

Put it in a bucket and run water on it while you stir it with your hand. This will remove the salt.



TEACHING SUGGESTIONS

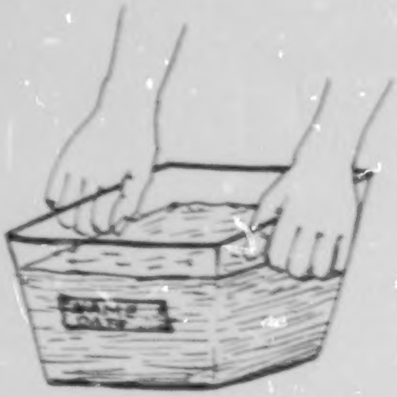
First Day-Setting Up The Aquarium

1. Ask the children if they have seen an aquarium before. Let the class discuss aquariums they have seen and what an aquarium is. Explain to the class that this aquarium will be different from aquariums they set up before. They will watch the organisms they put in this aquarium to see if they change.

2. Tell the children that they can set up an aquarium. They should watch closely as you demonstrate how to do it.

   Demonstrate how to set up an aquarium.

   a. Pour two cups of sand or gravel into an aquarium.
   b. Pour water into the aquarium until it is three-fourths full.
   c. Put a piece of masking tape at the water level. Ask the children if they know why you put the tape at that place.
   d. Lift the aquarium by its two opposite sides. Tell the children that the aquarium will crack if it is not carried this way.

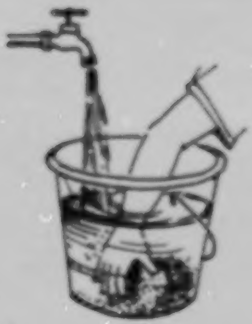


3. Divide the class into groups of four. Each group will set up one aquarium.

4. Let each group set up its aquarium.

   Show the students where they can get the sand or gravel.

If the sand or gravel is on the beach, wash the salt out of it.



Put it in a bucket and run water on it while you stir it with your hand.

5. Fill up one aquarium or bucket with water to use when water evaporates from the children's aquariums. Use rainwater or tap water.

   Tap water should set for 48 hours before you use it. This allows the chlorine in the water to leave. The chlorine could hurt the organisms if you do not let the water set.

6. Let each group put their names on the tape marking the water level. They should carefully carry their aquariums to the place in the room you have prepared for them. This place should be a table near the window, but not in direct sunlight. The aquariums must get a lot of light.

Second Day-Planning The Field Trip To Collect Organisms.

1. Tell the class: "Tomorrow we can get organisms for the aquariums."

   Discuss the following: What they are going to get: freshwater fish, snails, duckweed and other water plants, and small rocks with algae on them.

   Where they are going.

   What they need to take along. (nets, jars, buckets)

   How to dress for the trip.

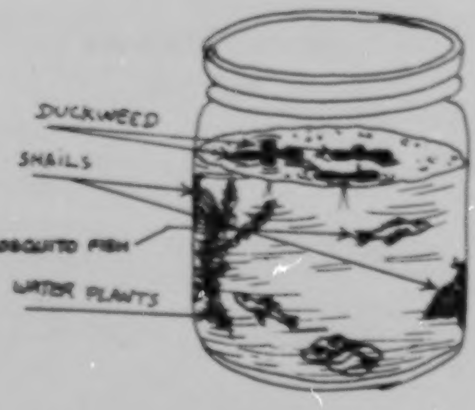
   Rules for the field trip. Be sure they know these.

   Only put a couple of each kind of organism in each aquarium. Don't get a lot of one kind of organism.

   Each group will get the organisms for its aquarium.

2. Be sure everything is ready for the trip tomorrow.

Third Day-Collecting The Organisms



1. Go on the field trip and collect the organisms.
2. Put the organisms into the aquariums. The children from each group should put their organisms into their group's aquarium.

   Each aquarium should have fish, snails water plants and a small rock with green algae on it.

Fourth Day-Observing And Recording The Organisms In The Aquariums

1. Let each group get its aquarium.
2. Give each child a magnifier and a sheet of paper.

   Ask them to carefully observe the organisms in their aquariums.

   Each child should make an aquarium record on the sheet of paper. They should draw what they see in the aquarium.

   Be sure the students understand the importance of the aquarium record. They will be watching the aquarium later to see if it changes. The students should observe and record the organisms now. For example: How many organisms? How big are the organisms? How many kinds of organisms?
3. Put the aquarium records in a safe place. Return the aquariums.

   Discuss the aquariums: "What organisms are in the aquariums?"

   "Did you see the organisms before? Where?"

Later-Observe The Aquariums In Class Once A Week-Look For Changes

Go on to other activities. Once a week have a class session to observe the aquariums.

The children will observe their aquariums during their free time. If the children see something interesting, you could have a class session to discuss their observations.

1. Tell the children that today they can observe their aquariums to see if there are any changes.

2. Let each group get their aquarium. Give each child a magnifier and his aquarium record sheet.

3. Let them observe, draw and discuss any changes in their aquariums. Encourage questions and answers from the children. Try not to give too many answers yourself.

   For example: "Do you still have the same number of organisms?"

   "Did the water change color?"

   "Are the organisms still the same size?"

4. If the water level has gone down in the aquariums, ask the children what they think happened to the water. Let them use the water in the extra aquarium to fill the aquariums up to the water lovel marked by the tape.

5. Ask the children what they think will happen to their aquariums if they set for another week.

6. Have the children return their aquariums and record sheets after each lesson.

TEACHER INFORMATION

You can help guide the children's observations by being a good observer yourself. You (the teacher) should look for changes in each aquarium.

For example: Something eats the plants.

Eggs or baby organisms appear.

Algae starts to grow in the water or on the side of the aquarium. The sides of the aquarium turn green. The water turns green.

Organisms disappear.

The plants grow new parts.

NOTE: This activity is the same as ACTIVITY 1, but this activity uses saltwater and saltwater organisms.

ACTIVITY 1A SETTING UP AND OBSERVING A SALTWATER AQUARIUM

WHEN CAN YOU USE THIS ACTIVITY?

1. You could use it in place of Activity 1 SETTING UP AND OBSERVING FRESHWATER AQUARIUMS.

2. You could use it in any time during the year.

SYNOPSIS (WHAT WILL YOU BE DOING?)

The class sets up a saltwater aquarium. They go on a field trip and get organisms for their aquarium. They observe the aquarium and discuss the organisms in it. They discuss changes that take place in the aquarium. You (the teacher) choose other ways to use the aquarium from a list of suggestions.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

As the children set up and observe the saltwater aquarium, they get actual experience with several populations of organisms. They get practice in observing and describing the changes and activities they observe in the aquarium.

This saltwater aquarium can be used to show predator-prey, changes in populations, plant eaters and animal eaters, food chains and webs. What the children see in this aquarium gives them experiences for use in many of the other activities in this unit. It also gives you a source of student interest to start many new experiment.

MATERIALS

For the class:

aquarium - two gallon or larger/ten gallon is a good size
masking tape
fish food (optional)
containers to carry saltwater in - plastic buckets
beach sand (washed)
several rocks or pieces of coral (for fish to hide in)
clean saltwater
paper
small fish net
containers for catching organisms
large net (optional)

air pump
filter
air stone (optional)
hose to hook the pump to the filter

If you cannot use a pump and filter at your school, read page 126. This tells you how to set up a saltwater aquarium without pumps or filters.

PREPARATION

Read: "How To Take A Field Trip" on page 110,
"How To Set Up An Aquarium" on page 116, and
"A Beach Field Trip" on page 114.

Find the beach you are going to on the field trip to get the organisms. It must be a safe place. You will need another adult (teacher or parent) to go with you. Make arrangements for this adult and transportation. Get the parent's permission for the field trip if it is the school's policy.

TEACHING SUGGESTIONS

First And Second Day-Getting The Aquarium Ready

1. Ask the children if they have seen an aquarium before. Let the class discuss aquariums they have seen and what an aquarium is.

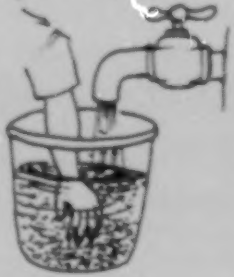
   Ask: "What would you need to make an aquarium for organisms from the ocean?"

2. Divide the class into three groups. Each group would be responsible for one of these jobs:

   Group #1 - Get enough beach sand to cover the bottom of the aquarium. The sand should be washed before putting it in the aquarium.

   Group #2 - Get enough clean salt-water to fill the aquarium.

   Group #3 - Get several rocks and dead pieces of coral to put on the sand in the aquarium. Not too many. Just enough for the fish to hide in.



3. Get the water, sand, and rocks into the classroom. You could do it by:

   Suggestion #1 - Take the children to the beach and let them bring the materials back.

   Suggestion #2 - Let some volunteers help you get the materials before class.

   Suggestion #3 - You (the teacher) get the materials before class.

   Use one of these examples to get the materials into the classroom.

4. Let each group put its materials into the aquarium.

   Group #1 - Put in the washed sand.

   Group #2 - Put in the clean saltwater.

   Group #3 - Put in the rocks and coral.

   Hook up the pump.

   Let the children put a piece of tape on the aquarium to mark the water level.

5. Tell the class: "Tomorrow we can get organisms out of the ocean for the aquarium."

   Discuss the following: What they are going to get.

   Where you are going.

   What they need to take along. (nets, jars, buckets)

   How you should dress.

   Rules for the field trip. (Be sure they know these.)

   You can only put a couple of each kind of organism in the aquarium. Don't get a lot of one kind of animal.

Third Day-Getting The Saltwater Organisms

1. Be sure the class knows their responsibilities. Check the above list before you start on the field trip. DID YOU READ "HOW TO TAKE A FIELD TRIP", "HOW TO SET UP AN AQUARIUM", "A BEACH FIELD TRIP"?

2. Take the children on the "beach field trip".

3. After the field trip:

   Let the children put their organisms into the aquarium. Remember don't put too many organisms in the aquarium.

Fourth Day-Observing The Aquarium

1. Let the children observe the aquarium. It is best to do this in small groups if possible.

2. Let the children make their own record of what is in the aquarium.

   Give them a sheet of paper. Let them draw the organisms.

   Some children may be able to write down the names of some organisms.

3. Discuss the aquarium. Below are some suggested questions:

   "How many kinds of animals are in it?"

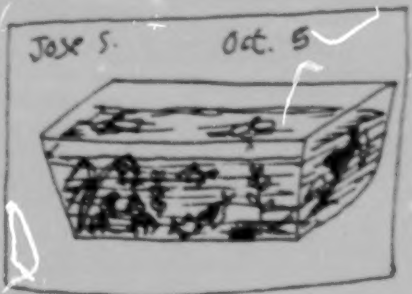
   "How many kinds of plants are in it?"

   "What do you know about these animals?"

   "Do you eat any of these organisms?"

   "What do these animals eat?"

   "What can we feed the animals?"



Later Days-Things To Do With The Saltwater Aquarium

YOU CAN USE THIS AQUARIUM FOR MANY THINGS. IT IS MORE THAN JUST A PRETTY THING IN THE CLASSROOM. BELOW ARE SUGGESTED WAYS TO USE THE SALTWATER AQUARIUM. YOU CAN PROBABLY THINK OF MANY MORE.

Suggestion #1 - Observe it once a week. Discuss changes that happen. "What happened?" "Why do you think it happened?"

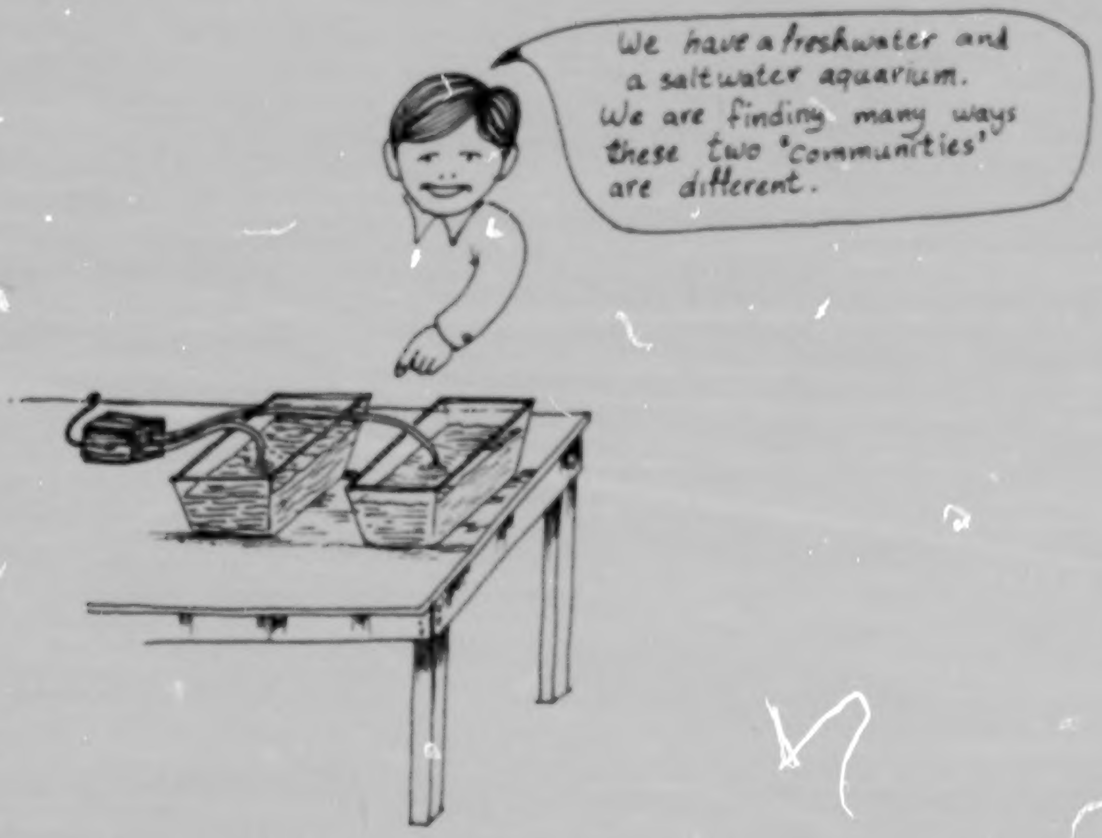
Suggestion #2 - Use it with Activity 2 Populations. The children can talk about the populations in the aquarium.

Suggestion #3 - Use it with Activity 3A Brine Shrimp and Fish. The children can put brine shrimp into the aquarium and observe what happens.

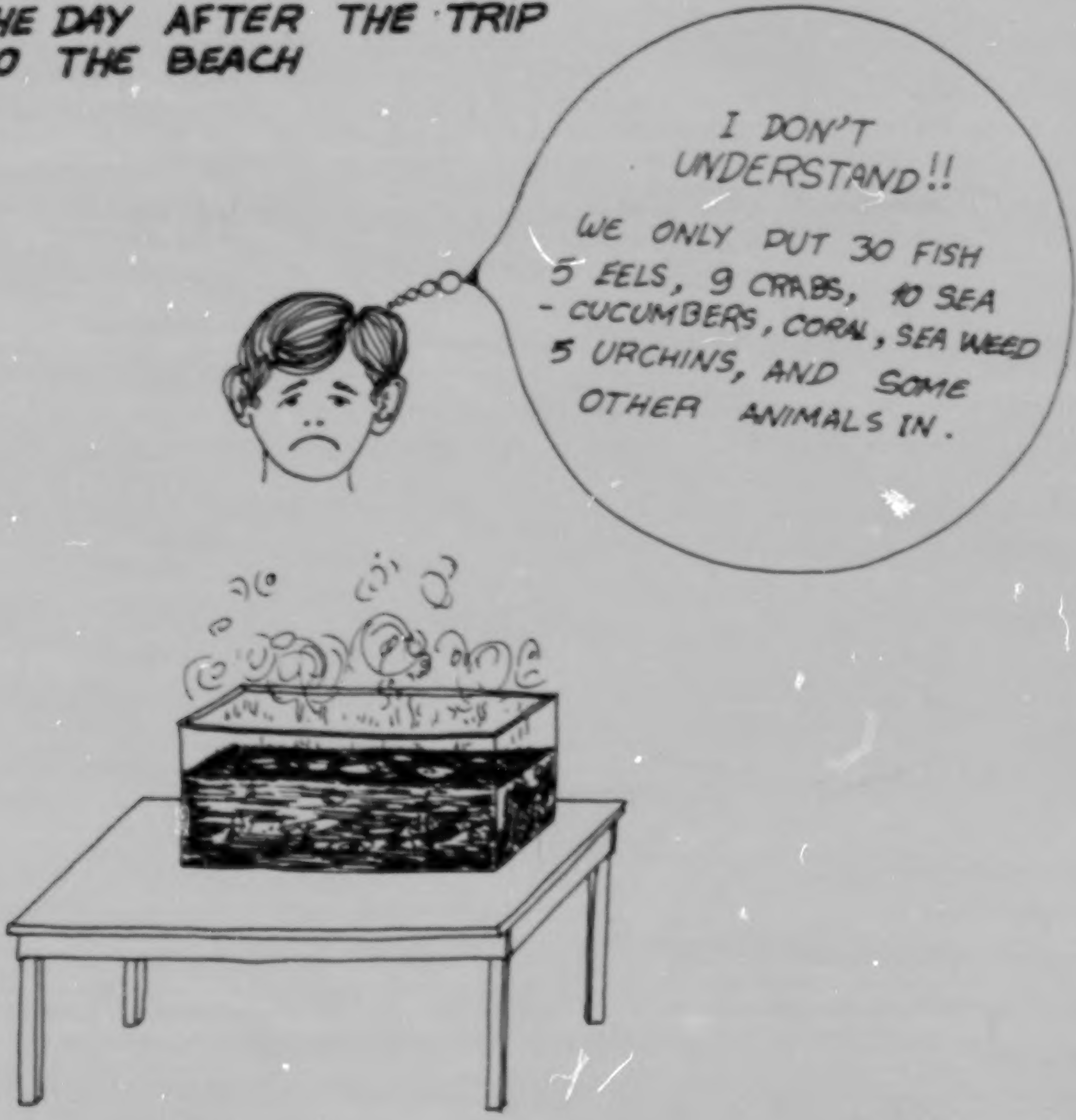
Suggestion #4 - Use it as part of any of the following activities: Activity 9 Plant Eaters and Animal Eaters, Activity 10B Predator-Prey Relationship, Activity 12 Food Chains, Activity 13 Food Webs.

Suggestion #5 - Listen to what the students say. Do experiment to answer questions they ask. For example:

> "Will the mosquito fish live in the saltwater? Will the saltwater fish live in the freshwater?"
>
> "What will they eat?"
>
> "What animal is eating the fish? Is it that crab?"


We have a freshwater and a saltwater aquarium. We are finding many ways these two 'communities' are different.

THE DAY AFTER THE TRIP TO THE BEACH


I DON'T UNDERSTAND!! WE ONLY PUT 30 FISH 5 EELS, 9 CRABS, 10 SEA-CUCUMBERS, CORAL, SEA WEED 5 URCHINS, AND SOME OTHER ANIMALS IN.

ACTIVITY 2 POPULATIONS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children go on a field trip to discover what kinds of organisms and how many of each kind they can find. They look in a small area and record (in drawings) what they find. Back in the classroom, the children's records are put together. The word population is introduced. The children then identify the populations in their aquariums and in pictures.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity allows the children to have actual experience with populations. Then, you introduce the concept of "populations" to them. By having the actual experience, they can talk about "populations" easily.

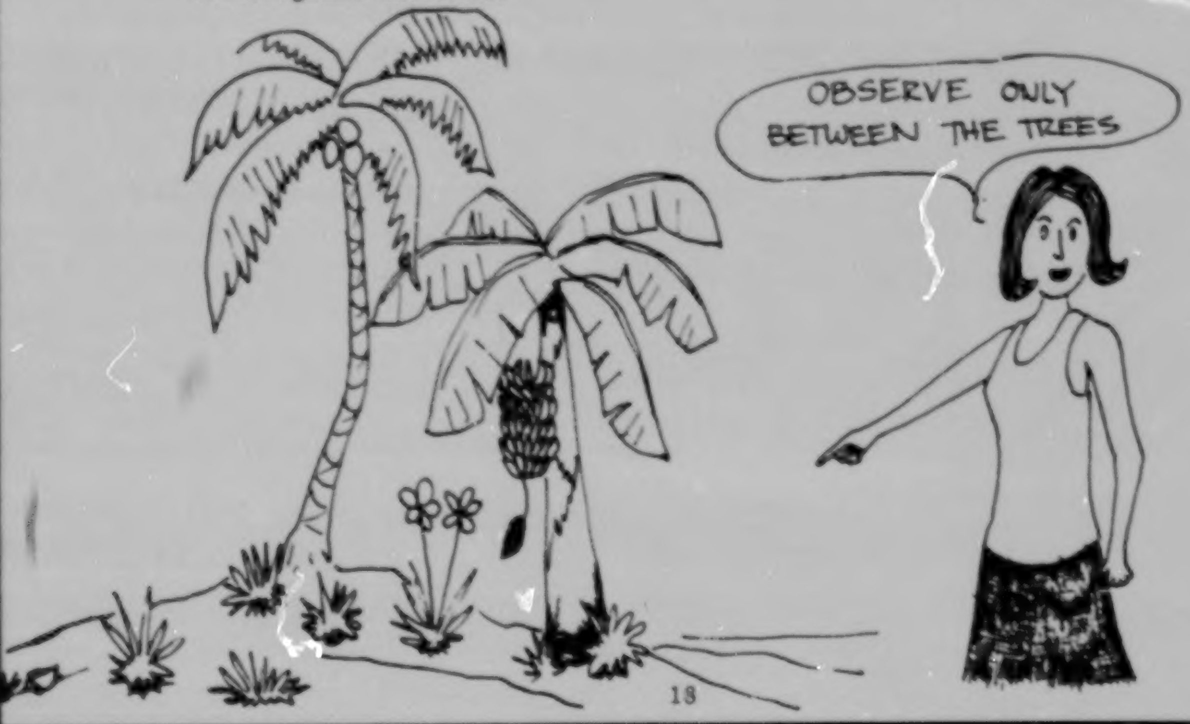
MATERIALS

For each child:
  sheet of paper
  "population" picture

For the class:
  chart paper
  overhead transparency of the "populations" picture (optional)

PREPARATION

The children will be confused if the area they observe on the field trip is too large. The teacher should select a small area ahead of the time you take the field trip. Make sure you can tell the children the boundaries of the area to be observed. For example: "Between these two lines on the beach", "In that corner of the playground.", "Around that banyan tree." "Between this building and the road."


OBSERVE ONLY BETWEEN THE TREES

TEACHING SUGGESTIONS

First Day-Taking The Field Trip

1. Tell the children they are going on a field trip.

2. Give each child a piece of paper. Explain that they are to draw each kind of plant and animal they see. They should also mark down or remember how many of each kind they see.

3. Tell the children the exact area they should look at on the field trip.

4. Take the children to the area you wish observed. Give them time to make their observations. If they do not know the names of the organisms they can call them "small white flowers", "long tailed animal" and etc. You may ask the children questions like:

   "What kinds of plants do you see?"

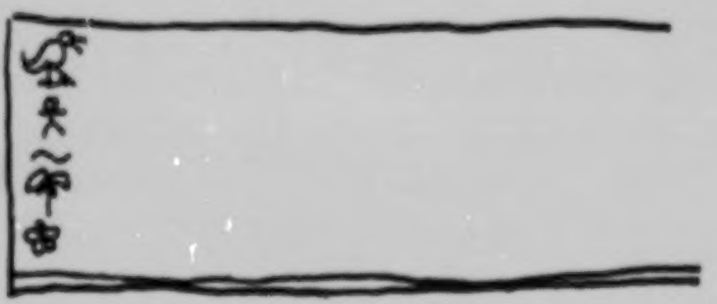
   "How many of each kind are there?"

   "What kinds of animals do you see?"

Second Day-Discussing The Plants And Animals Seen On The Field Trip

1. Let the class discuss what they saw on the field trip.

2. Make a picture record on the chalkboard or chart paper of each kind of plant or animal the children discuss. Keep this record for use in making the graph the next day.



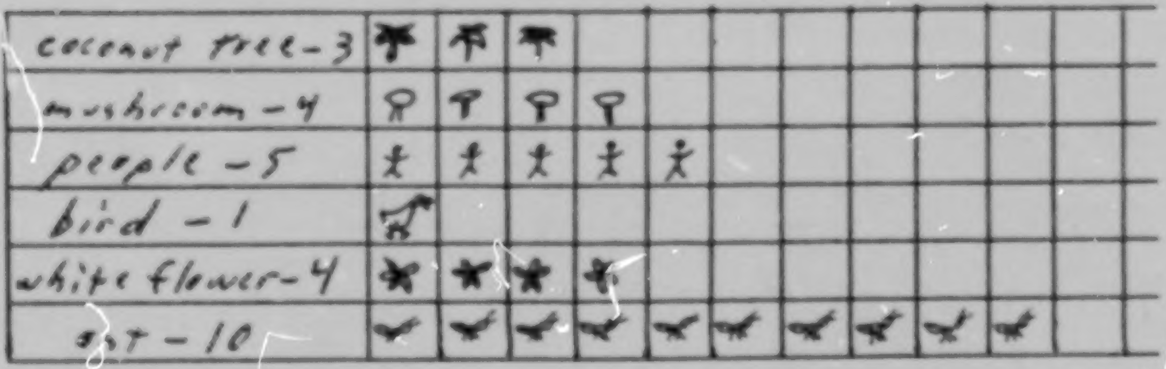
Third Day-Making A Graph Of The Plants And Animals Observed On The Field Trip

1. Use the drawings from the Second Day to make a record of the number of plants and animals the children saw. Here are several ways to do this. Use the way that you think is best for your class.

2. Do not worry about the exact number. It is more important that the children see there were many of one kind of plant or animal and only a couple of another kind.

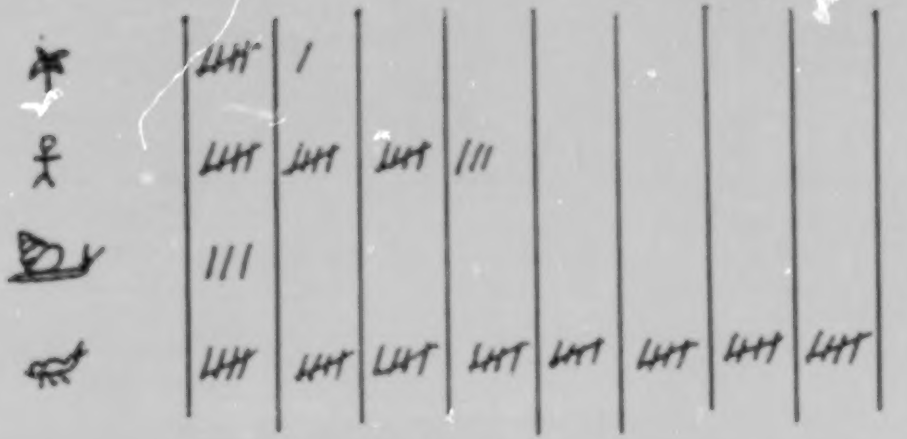
Example #1

Make a graph using pictures. On chart paper make a picture or symbol for each plant and animal the children observed.



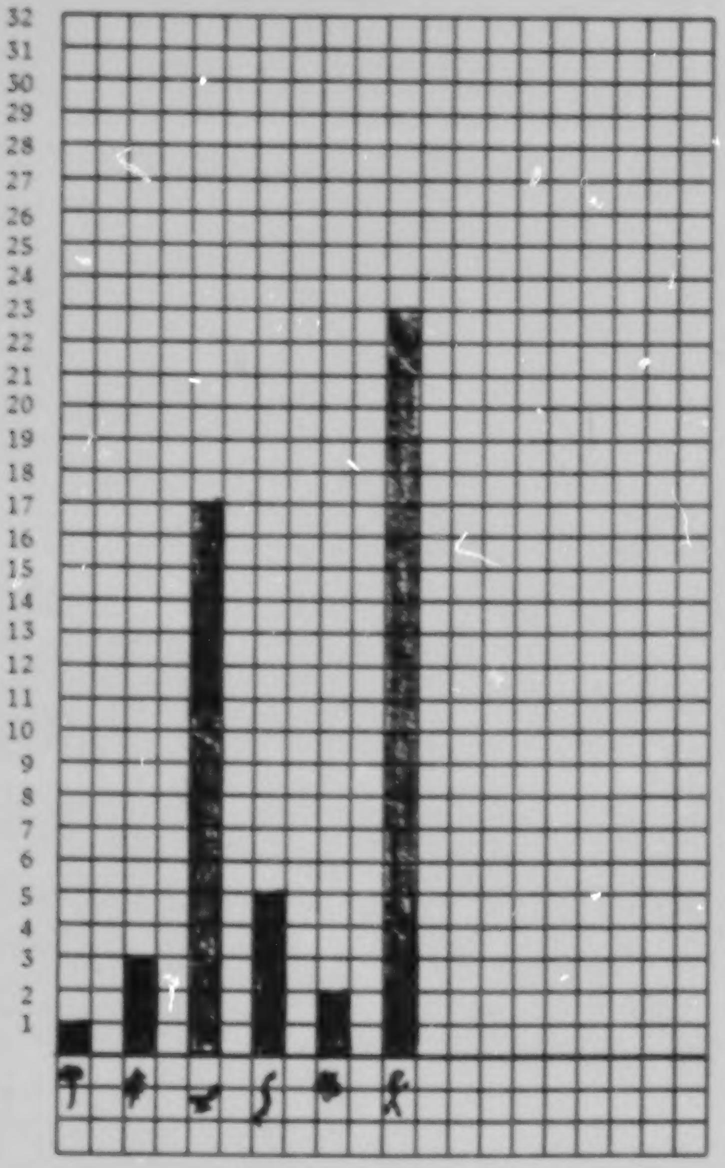
Example #2

Make a graph using pictures and marks. On chart paper make a picture of each kind of plant and animal the children observed. Place / marks beside the picture to show how many were observed. All the marks should be the same size and distance apart.



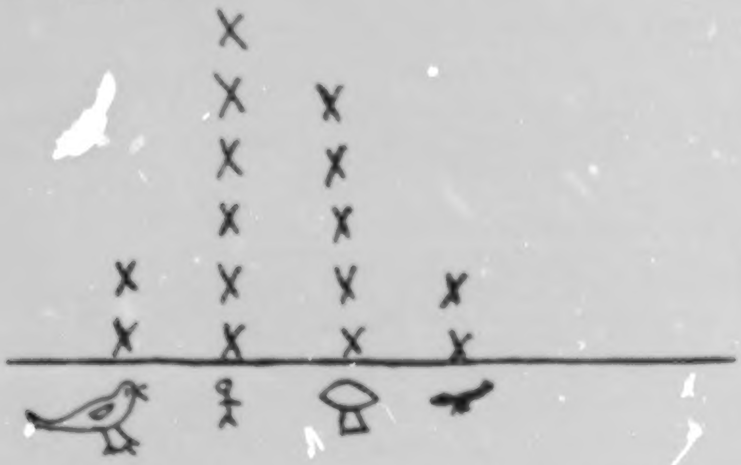
Example #3

Make a graph using graph paper and pictures. On chart paper marked off in squares, make a bar graph showing the numbers and kinds of organisms the children observed.



Example #4

Make a "Histogram" using pictures and Xs. Place a drawing of each kind of organisms observed on chart paper. Put an X for each organism observed.



Fourth Day-Inventing The Concept Of "Population"

1. Explain to the class that, "A GROUP OF THE SAME KIND OF LIVING ORGANISMS IN THE PLACE IS CALLED A POPULATION".

   For example: "All the snails you saw on the field trip is a population".

   "All the hermit crabs living on the beach is a population".

   Write the word POPULATION on the chalkboard. (Do not write the definition on the chalkboard.)

2. Give each child a "populations" picture. If you have the overhead transparency you can point to it as the children talk about the "populations" picture.

3. Have a class discussion about the "populations" picture.

   "Which are animal populations?"

   "Which are plant populations?"

   "Which population is the largest?"

   "Which population is the smallest?"

4. Let the children talk about the populations in their aquariums and the populations they saw on the field trip (refer to the field trip graph).

5. What to know about populations. You do not have to discuss all of the following points at one time. These are best discussed when the children bring up questions about a certain point.

   a) A population is two or more organisms of the same kind. They may be at different stages in their life cycle or they may be of a different sex or a different age.

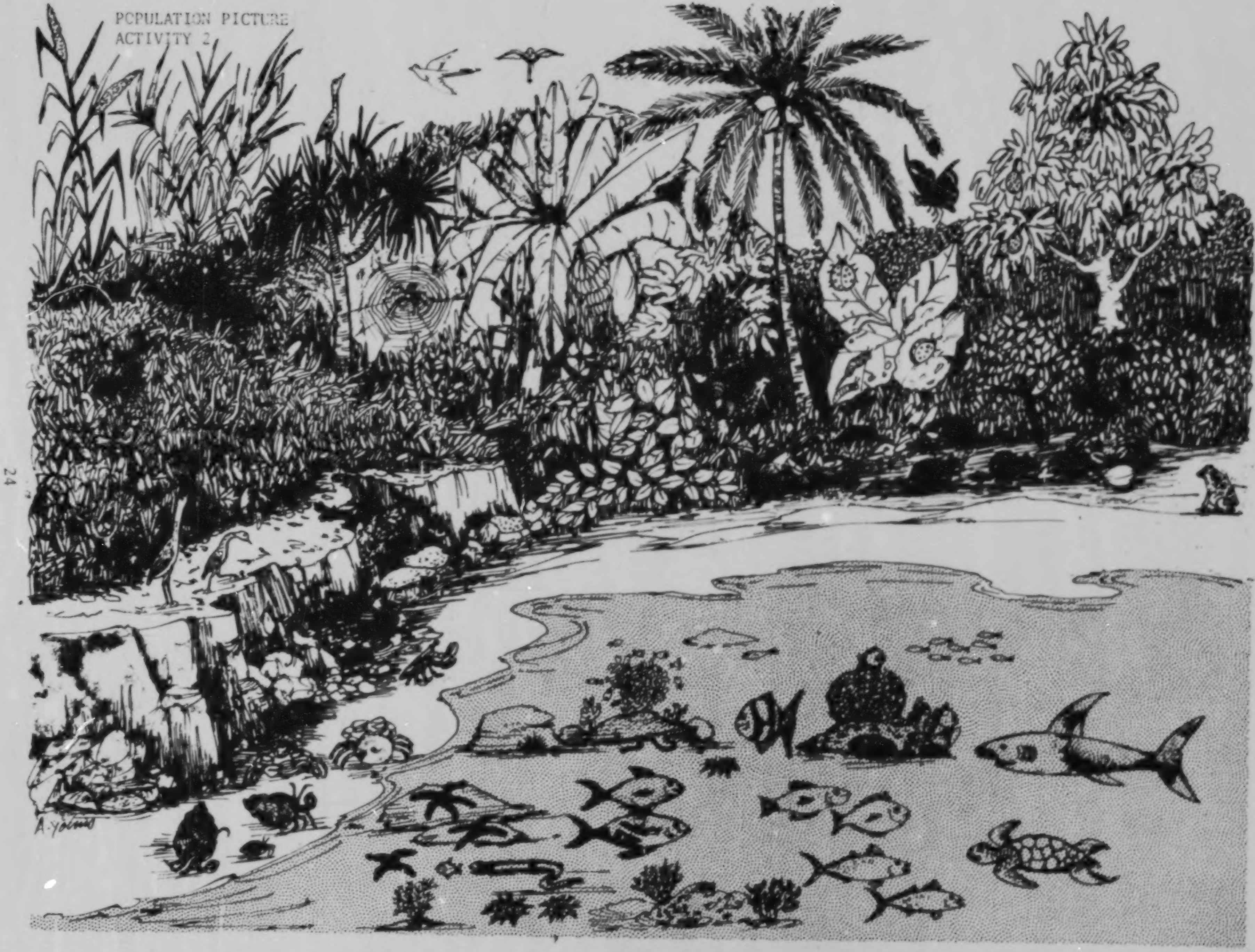
   b) There are plant and animal populations.

   c) Populations are made up of living organisms. They are born, grow, have young ones and then die.

   d) When we talk about size of the populations we mean the number of organisms in a populations not the size of the organisms.

   For example: You might ask the children, "Which is larger, a population of ten chickens or a population of 100 ants?" If they have difficulty with this question you could say, "The ant is a smaller animal than the chicken, but the number 100 is more than 10. Therefore, we say that the ant population is larger than the chicken population."

POPULATION PICTURE
ACTIVITY 2



ACTIVITY 3 MOSQUITO LARVA AND MOSQUITO FISH

SYNOPSIS (WHAT WILL YOU BE DOING?)

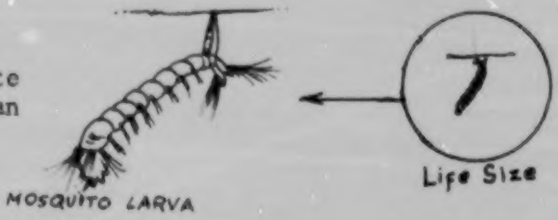
The children observe mosquito larva (daphnia or an animal like daphnia may be used as a substitute). These animals are then added to two new aquariums which contain only water and to the old aquariums from Activity 1. The children observe the aquariums over a period of time to see if the mosquito larva populations change. The children try to answer the question "What happened to the mosquito larva?".

OVERVIEW OF THE ACTIVITY (WHY ARE YOU DOING THIS?)

This activity allows the children to watch a population change in size. It is hoped they will be able to come up with reasons for the change. These reasons for change in population size would be environmental conditions. This is the beginning of letting the children observe and discuss how the environment affects populations.

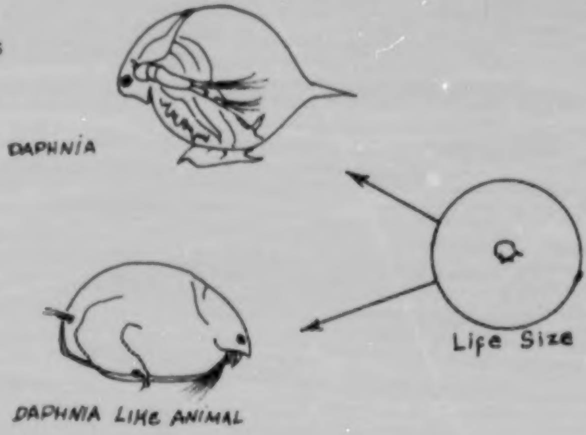
MATERIALS

For each child:
- mosquito larva or a substitute organisms such as daphnia, an animal like a daphnia
- jar with a lid
- magnifier
- sheet of paper



For each group of four children:
- aquarium from Activity 1 (containing the organisms placed in it during Activity 1)

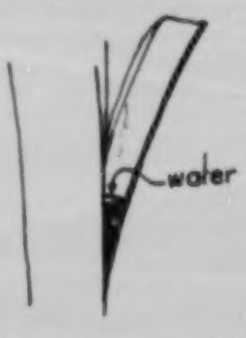
For the class:
- two aquariums: each containing mosquito larva (or a substitute organism)
- sixteen medicine droppers
- masking tape
- ten medium sized jars



PREPARATION

1. Collecting the organisms - mosquito larvae can be found in places where freshwater stands. For example, look in puddles, water catchments, old cans, ditches, and empty coconut shells.

You can grow your own mosquito larvae. Just put a piece of fruit in some freshwater. Let it set for several days in a place where adult mosquitoes can land on it.



Daphnia or animals like daphnia can sometimes be found in small puddles of freshwater or in the small amount of water held in the pandanus tree where the leaves are attached to the tree.

Choose the kind of organism you want to use and collect them two days before the day you will need them in class. The rest of this activity we will call the organism "mosquito larva". You will have to change the name if you use another organism.

2. Prepare the two aquariums that will have only mosquito larvae in them. Place water and four mosquito larvae in each.

3. Put one mosquito larva and some water in each jar. Prepare a jar for each student the day before class.

TEACHING SUGGESTIONS

First Day-Observing Daphnia

1. Tell the class you have an organism for them to observe. Give each child a jar containing a mosquito larva and some water.

2. Tell the children they can use the medicine droppers to take the organism out of the jar and place it in the lid. They can then observe it better. Give each child a magnifier.

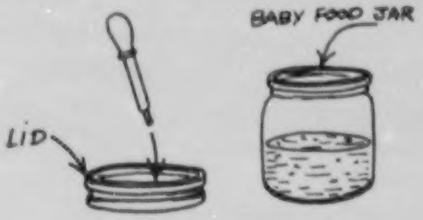
3. Let the class observe the mosquito larva and discuss their observations. Move around the room and ask questions like:

   "How does it move?"

   "Have you seen it before?"

   "Is it like your neighbor's?"

   "Does it have a head?"



4. After the children have observed the mosquito larva, give each child a sheet of paper. Ask them to draw their organism and compare the drawing with their neighbor.

5. At the end of the period, put the organisms back in the jars and place them in safe place.

Second Day-Adding The Mosquito Larvae To The Aquariums

1. Let the children move into the same groups as for Activity 1. Let one member of each group get that group's aquarium.

2. Briefly discuss what populations are in the aquariums and any changes that have taken place since the children observed last.

3. Give each group a piece of masking tape to put on their aquarium. Tell them that the population of mosquito larvae is to be added to the aquarium. They should mark the number of mosquito larvae they put in the aquarium on the tape.

4. Give each student a jar with the mosquito larva in it. Tell them to add them to the aquarium and to mark down the number they put in.

5. Show the children the two aquariums you have fixed. Each should have four mosquito larvae in it. Mark down the number on the tape on each aquariums.

6. Ask the class what populations are now in their aquariums. Place the children's aquariums and your own aquariums together in a safe place.

Third Day-Counting The Mosquito Larvae Populations

1. Let each group get its aquarium. Ask the children to count the daphnia population and look for any changes.

2. Discuss any change the children observe. Ask questions like:

   "Did all the aquariums change?"

   "Did the two aquariums the teacher made change?"

   "What changes did you observe?"

   "What do you think caused the changes?"

   "What evidence do you have for your answers?"

   "How can you find out for sure?"

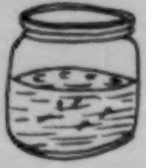
   "What happened to the mosquito larva?"

3. If the mosquito larvae population has not gone down (decreased in number) in the children's aquariums, observe again tomorrow. If the mosquito larvae population has gone down, ask the class what experiments they can think of to find out what caused the population to go down (decrease in number).

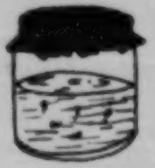
4. Record the suggested experiments on the chalkboard using drawings. Below are some examples of experiments the children might suggest:

Example #1

The children think the mosquito larvae disappeared because they changed to adults and flew away. The population decreased.



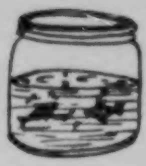
5 mosquito larvae
top open



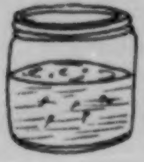
5 mosquito larvae
cloth over top

Example #2

The children think the mosquito larvae population decreased because the fish ate the mosquito larvae.



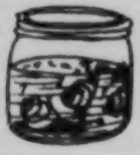
5 mosquito larvae
and 2 fish



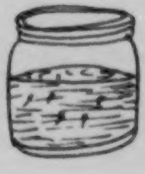
5 mosquito larvae

Example #3

The children think the mosquito larvae population went down because the snails ate them.



5 mosquito larvae
and 3 snails



5 mosquito larvae

5. Tell the children that tomorrow they can try their experiments. Return the aquariums to a safe place.

Fourth Day-Trying The Children's Experiments To Find Out What Happened To The Mosquito Larvae.

1. Let each group pick an experiment to try. Use the experiments suggested yesterday or new ones they may have thought of.

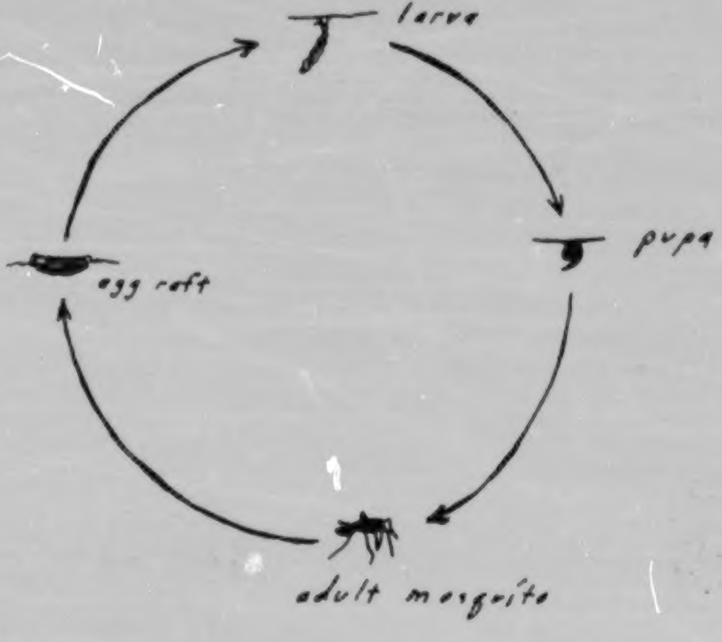
2. Give each group the materials they will need for their experiment. Let them use the medium sized jars for containers. Let them set up and observe their experiment. At the end of class put the containers in a safe place.

Fifth Day-Observing The Experiments

1. Let the children observe their experiments for change. Discuss any change. Ask, "Does this show you what happened to the mosquito larvae?"

2. You as a teacher will have to decide how much time to spend on this. You may wish to let the experiments set for a time before observing them again. You may wish to end the experiments now and clean up the materials. Let the children's interest be your guide on what do do.

Mosquito Life Cycle-Life Size Drawings



ACTIVITY 3A BRINE SHRIMP AND FISH

WHEN CAN YOU USE THIS ACTIVITY?

1. You could use it in place of Activity 3 DAPHNIA AND MOSQUITO FISH.

2. You could use it with Activity 1A OBSERVING AND BUILDING SALTWATER AQUARIUM.

3. You could use it at any time during the year.

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children observe brine shrimp eggs. They put the eggs in saltwater and hatch the shrimp. The brine shrimp are put into aquariums containing: saltwater and fish, freshwater and fish, saltwater, freshwater. The children observe the aquariums over a period of time to see if the brine shrimp population changes. The children try to answer the question, "What happened to the brine shrimp?".

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity allows the children to watch a population change in size. It is hoped they will be able to come up with reasons for the change. These reasons for change in population size should be environmental conditions. This is the beginning of letting the children observe and discuss how the environment affects populations.

MATERIALS

For each child:
- brine shrimp eggs
- jar with a lid
- magnifier
- sheet of paper

For the class:
- four small saltwater fish
- four mosquito fish
- saltwater
- freshwater
- soil
- four small aquariums (1 gallon)
- masking tape
- yeast

PREPARATION

You will need the fish a week after you start this activity. If you do not have them in aquariums in your classroom, you will need to get them. You could have student volunteers bring the fish in.

TEACHING SUGGESTIONS

First Day-Looking At The Eggs

1. Give each child a piece of paper and a magnifier.

   Put some brine shrimp eggs on the paper. Do not tell them what it is.

   Let the children observe the eggs.

2. Have a class discussion:

   > "What do you think this material is?"
   >
   > "Have you ever seen anything that looked like this?"
   >
   > "What should we do with it?"

3. Show the class the saltwater, freshwater and soil.
   Give each child a jar.

   Say: "Each of you pick one of these (saltwater, freshwater or soil) to put your materials in."

   "Put a piece of masking tape on your jar. Put your name and what you put in the jar (saltwater, freshwater or soil) on the tape."

   Let the children put their jars together on a table.

Second Day-Observing the Jars

1. Let the children observe their jars. Give them magnifiers.

2. Discuss any changes that they observe.

Third Day-Observing The Jars

1. Let the children observe their jars. Give them magnifiers.

   THE BRINE SHRIMP IN THE SALTWATER SHOULD HAVE HATCHED BY THE THIRD DAY.

Children who used soil or freshwater could start new experiments. Give them brine shrimp eggs and saltwater if they ask for them.

2. Have a class discussion:

   "What changes did you observe in your jar?"

   "Did all the jars have changes in them?"

   "What do you think the material was that you put in the jar?"

   "This animal is called a brine shrimp. How large is your brine shrimp population?"

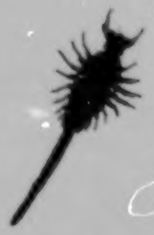
   "How do they move?"

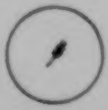
   "Do they stay on the top or bottom of the jar?"

   "Will they grow bigger?"

   "Do they bump into each other?"

   "Will the rest of the eggs hatch?"


Brine shrimp


Actual size

3. Give each child one grain of yeast to put in his jar. Tell them this is food for the brine shrimp.

   Tell the children they can feed their shrimp one piece (grain) of yeast every Monday and Friday.

   If you feed the brine shrimp too much yeast, the water will turn white and the brine shrimp will die.

Fourth, Fifth, Sixth and Seventh Days-Observing The Brine Shrimp

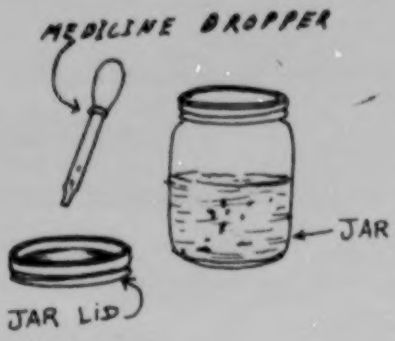
1. Let the children observe their shrimp during these days. Some lessons may be very short.

   Give the children magnifiers and medicine droppers to use in observing.

2. On the seventh day the shrimp should be easy to see. Let the children draw a picture of a shrimp.

3. Discuss questions the children ask.

4. Keep the water level the same in the jars. Replace evaporated water with freshwater.



Eight Day-Putting Brine Shrimp In Different Aquariums

1. Let each child get his brine shrimp.

   Divide the class into four groups.

   Give the first group: aquarium of saltwater.

   Give the second group: aquarium of freshwater.

   Give the third group: aquarium of saltwater and four saltwater fish.

   Give the fourth group: aquarium of freshwater and four mosquito fish.

2. Say: "What do you think will happen if you put ten brine shrimp in each aquarium?"

   "Each group should put ten brine shrimp in its aquarium.

   Give each group two medicine droppers. Let them put their names on the aquarium with tape. Let them mark what is in each aquarium. For example:

   SALTWATER
   4 FISH 10 SHRIMPS

   Say: "What is the population of fish in each aquarium?"

   "What is the population of brine shrimp in each aquarium?"

   Let the children put their aquariums together on the table.

Ninth Day-What Happened to The Brine Shrimp?

1. Let each group get its aquarium.
   Let them observe it.

   Have a class discussion:

   "What changes did you observe?"

   "What is the population of brine shrimp in each aquarium today?"

   "What happened to the brine shrimp?"

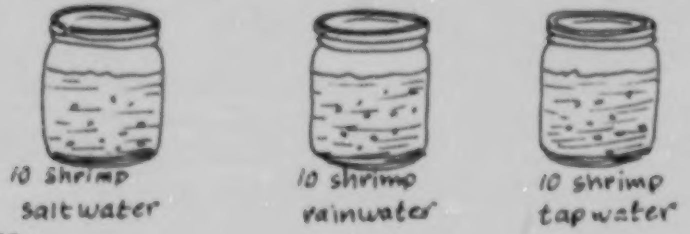
   "What evidence do you have for your answer?"

2. Ask the class what experiments they can do to find out what made the population of brine shrimp go down.

3. Record the suggested experiments on the chalkboard using drawings. Below are some examples of experiments the children might suggest.

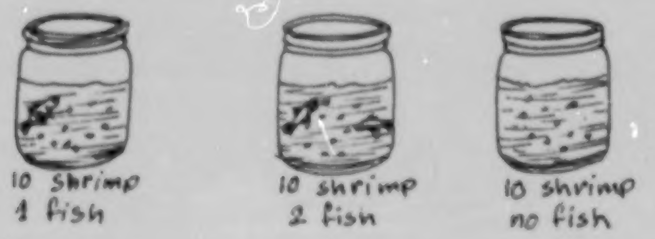
Example #1

The children think the brine shrimp died because of the water.


10 shrimp
saltwater
10 shrimp
rainwater
10 shrimp
tapwater

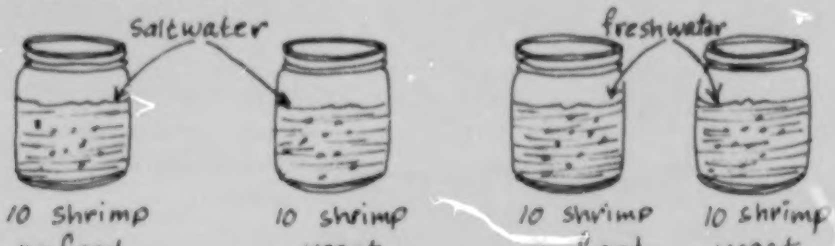
Example #2

The children think the shrimp population went down (decreased) because the fish ate them.


10 shrimp
1 fish
10 shrimp
2 fish
10 shrimp
no fish

Example #3

The children think the shrimp population went down (decreased) because there was no food.


saltwater
freshwater
10 shrimp
no food
10 shrimp
yeast
10 shrimp
no food
10 shrimp
yeast

4. Let each group pick an experiment to try.

   Give each group the materials they will need for their experiment. Let them set up their experiment.

   At the end of class put the experiments in a safe place.

Tenth Day-Observing the Experiments

1. Let the children observe their experiments for change.

   Say: "What changes did you observe?"

   "Does this show you what happened to the brine shrimp?"

2. You as a teacher will have to decide how much time to spend on this. You may wish to let the experiments set for a time before observing them again. You may wish to end the experiments now and clean up the materials. You may wish to do some of the OPTIONAL ACTIVITIES. Let the children's interest be your guide on what to do.

OPTIONAL ACTIVITY-MORE ABOUT BRINE SHRIMP

You can do some experiments with the following questions if the children show interest. Listen to the children and let them do experiments to answer their questions.

When will they hatch?

"Will they hatch in freshwater?"

"Will they hatch if I add two spoonfuls of salt to the water? Three spoonfuls?"

"Will they hatch in the refrigerator?"

What do they eat?

"What if I put food coloring in the yeast. Will the shrimp be the same color?"

"What if I put in a lot of yeast?"

"Will they eat algae? Bread?"

How big do they get?

"Will they get big enough to eat?"

How long do they live?

What do they like best?

"Do they like the dark or the light?"

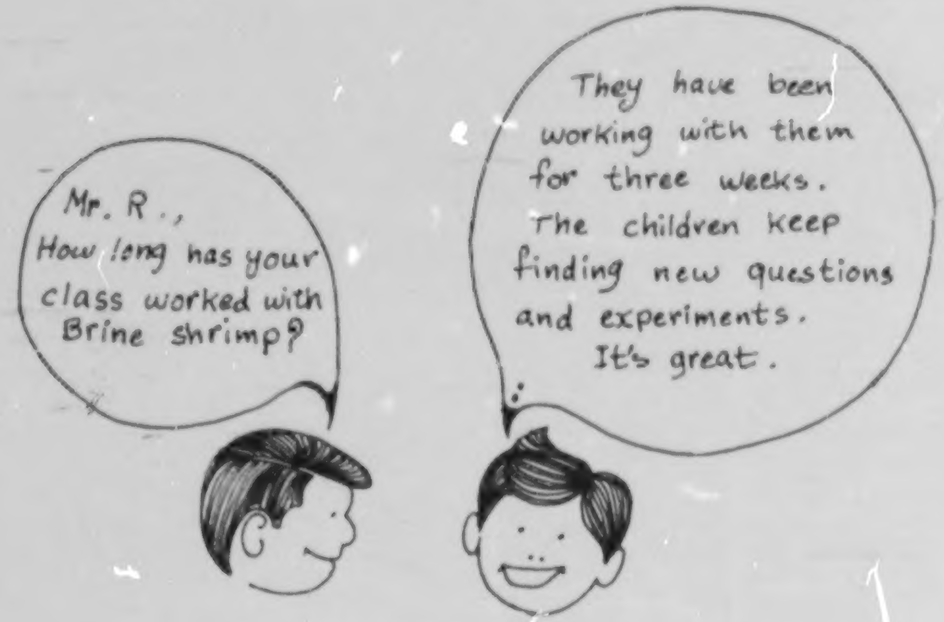
"Do they like the heat or the cold?"

How fast does a brine shrimp swim?

Will they lay eggs?

Will more brine shrimp reproduce?

You can refer to the "E. S. S. Teacher's Guide for Brine Shrimp" for more information.


Mr. R., How long has your class worked with Brine shrimp?
They have been working with them for three weeks. The children keep finding new questions and experiments. It's great.

How many eggs does a brine
shrimp lay?

Will it live in
fresh water?

How fast does a brine
shrimp swim?

How many legs
does it have?

Can they see?

Is the picture on this
page upside down?

Do they stay at the
bottom or top of
the jar?

How long does one brine shrimp live?

Do they sleep
at night?

What if I freeze the eggs, will
they still hatch?

Does it like light
or dark?

Can I see them
eating?

Can we eat
them?

Do they live in
salt water made
from table salt?

How big do
brine shrimp grow?

ACTIVITY 4 DUCKWEED

SYNOPSIS (WHAT WILL YOU BE DOING?)

It is noticed that the duckweed populations in the aquariums changed. A discussion is held on how to make the duckweed population increase. The children then set up experiments to test their ideas about what may affect the growth of the duckweed populations.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

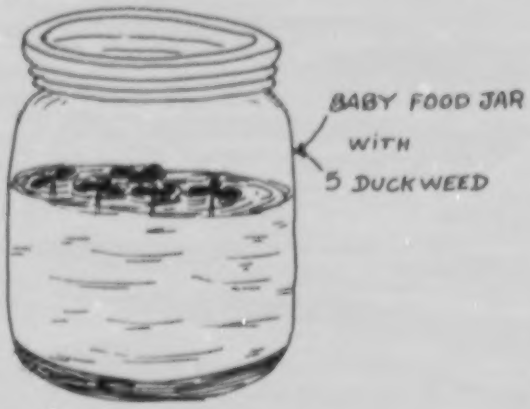
This activity helps the children to see that plants form populations too. They get experience in setting up their own experiments.

The main thing you want is for the children to come up with their own explanation of what caused the duckweed population in their experiment to change (increase or decrease). This will give them further experience to help them see that populations are affected by the environment.

MATERIALS

For each child:
- jar with lid
- five duckweed plants
- magnifier
- Duckweed Record worksheet

For the class:
- masking tape
- paper towels
- aquarium water
- chart paper



PREPARATION

Make sure you have enough duckweed left in the aquariums to do this activity. You may have to get some new if it has decreased in the aquariums. Keep all new duckweed in its own special container, not in the children's aquariums.

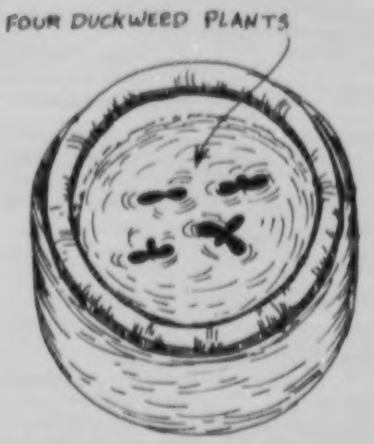
When the children set up their own experiments, you may have to supply more materials such as soil, fertilizer, etc. or you might have the students supply this material.

TEACHING SUGGESTIONS

First Day-Observing The Duckweed Population

1. Let each group get their aquarium. Ask the children to observe the duckweed population. Give them magnifiers and allow some time for observation.

2. As the children observe the duckweed population, the following areas can be discussed:



> "Has the duckweed population become larger or smaller since you built the aquarium?"
>
> "Why did the population change?"
>
> "Did the population go up in everybody's aquariums?"
>
> "Did the population go down in everybody's aquariums?"
>
> "How many duckweed plants do you have now?"
>
> "What does a single (one) duckweed look like? How many leaves does it have? Can you name the plant parts?"

Be sure the children all agree on what a single (one) duckweed plant is. A single plant should be able to float freely on the water and may have one, two, three, four or five leaves.

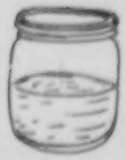
3. Ask the children to think of ways to make a duckweed population become larger (increase in number).

You might suggest: "Pretend that the duckweed is good to eat and you want to grow a lot of it. You want a large population of duckweed. What are the things you might do to get the duckweed you now have to become more in number (increase the population)? Sort of like a duckweed farm."

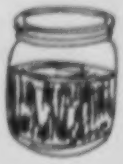
List the children's suggestions on the chart paper by using drawings and simple words to label the drawings.

Examples of possible student suggestions:

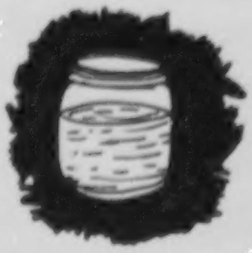
"Put it in lake water."



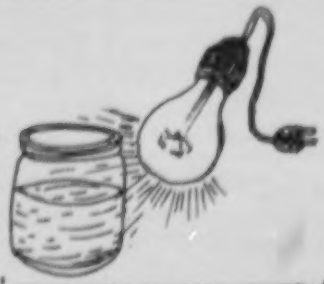
"Put manure or mud with it."



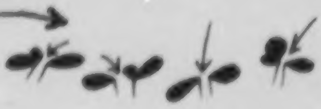
"Put it in the dark."



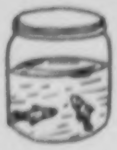
"Put it in the light."



"Cut the plants in half."



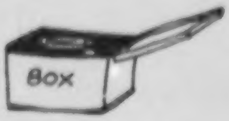
"Add fish to the water."



Second Day-Picking An Experiment To Do

1. After the children's suggestions are all listed, ask the students to decide which suggestion they wish to use in their experiment. Each student can pick any suggestion. Encourage the children not to pick the same one. Put the student's name on the chart beside the suggestion he is going to experiment with.

Example: "Put it in the dark."



Elmo Salii
Juan Sablan

2. Each student should have a jar with a lid. Give each student a piece of masking tape to label his jar with his name.

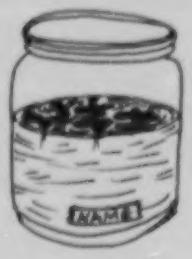
Third Day-Setting Up The Experiments

2. Have a class discussion on what they now need to set up their experiment.

2. Each student should have a jar with a lid. Give each student a piece of masking tape to label the jar with his name.

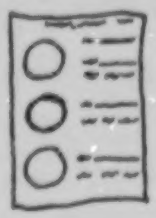
3. Let each student put the kind of water he will be using in his experiment in the jar.

4. Pass around containers of duckweed or the children's aquariums. Let each child put five (5) duckweed plants in his jar. Tell them to record the number of duckweed on the tape.



5. Let each child add to his jar the other materials he needs in his experiment. For example: Jose adds mud to his jar.

6. Give each child a "Duckweed Record Sheet". Let them draw the duckweed, exactly as it looks, in the top circle.



7. Let each child place his jar where it can get light or where his experiment says it should be placed. For example: Maria's experiment places the duckweed in the dark.

8. Tell the children that the experiments will be observed in a week. If all the jars have lids they will not need to add water. If some jars do not have lids, the children should check them every two days to add water so they don't dry up.

Fourth Day-Cleaning Up The Aquariums

You will need the aquariums for the next activities to put soil in and build terrariums in. Let the class decide what they wish to do with the organisms in the aquariums.

"Let's put all the organisms in one aquarium and see what happens."

"Let's take the organisms home."

"Let's put the organisms back where we found them."

It is a good idea to stress good and complete cleanup.

- a. Don't be cruel to the organisms.
- b. Let students do the cleaning up. Let them feel responsible.
- c. You guide the clean-up to prevent breakage and messing around.
- d. Store the aquariums and containers in a safe place.

One Week Later-Observing The Duckweed

1. Let the children get their duckweed jars. Give the children their "Duckweed Record Sheet". Ask them to observe and see if there has been any change. Discuss the changes:

   "Has the population changed?"

   "Has the color changed?"

   "What do you think caused the change?"

   "What do you think will happen if we wait another week?"

2. Let the children draw their duckweed population in the second circle.

3. Collect the "Duckweed Records" and let the students put the jars back. Tell the children they will look at the jars in another week.

One Week Later-Observing The Duckweed For The Second Time

1. Let the children get their duckweed jars. Give them their "Duckweed Record" sheets. Ask them to observe the jars for change. Discuss the changes.

2. Let the children draw their duckweed population in the third circle.

3. Let each child tell the class how many duckweed he now has.

4. Let the class discuss the question, "What caused the change in population to be more in some jars?"

   "What was in the jar?"

   "Where was the jar kept?"

   "How much did the population change?"

5. Let the class decide if they are ready to cleanup the experiments or if they wish to continue it and see what will happen.

DUCKWEED RECORD

ACTIVITY 4

NAME______________________________

DATE______________________________

DRAW THE DUCKWEED IN THE CIRCLE.

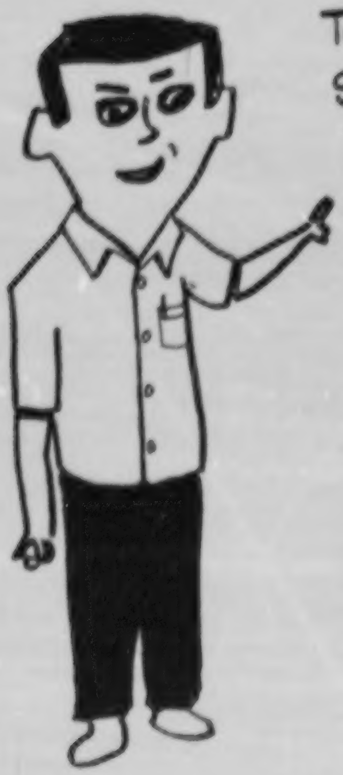
DATE______________________________

DRAW THE DUCKWEED IN THE CIRCLE.

DATE______________________________

DRAW THE DUCKWEED IN THE CIRCLE.

MR. PREPARED



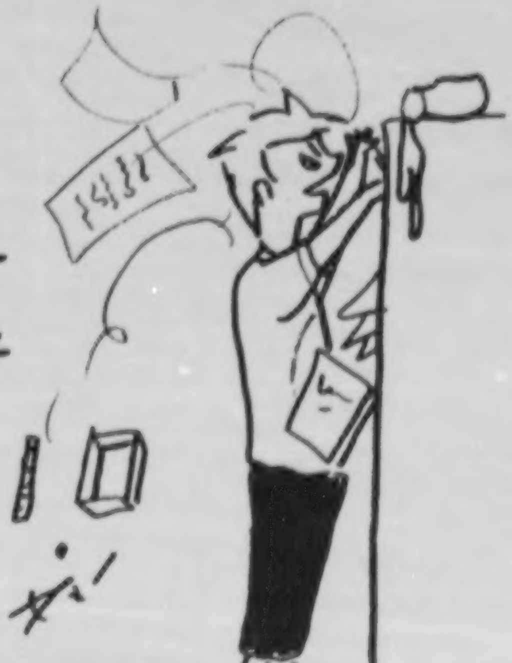
TODAY WE WILL COLLECT SEEDS FOR OUR TERRARIUM. —

WE WILL GO OVER TO THAT END OF THE PLAYGROUND. —

DOES EVERYONE HAVE THEIR CAN FOR THE SEEDS? —

REMEMBER OUR FIELDTRIP RULES. —

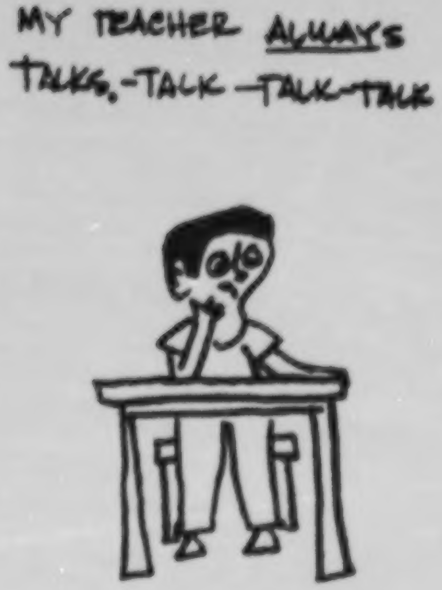
MR. CONFUSION

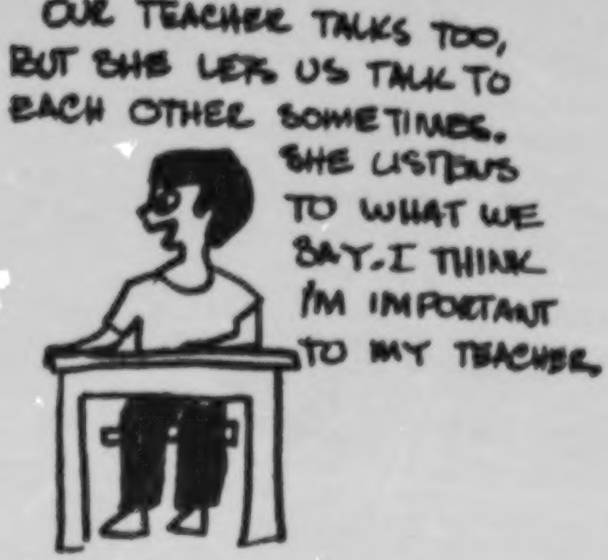


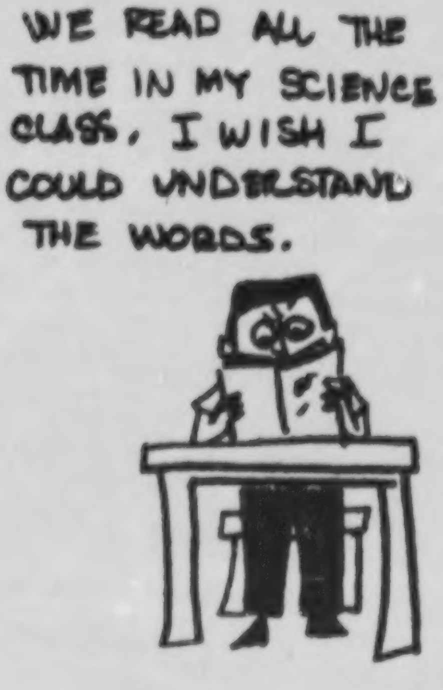
TODAY WE WILL -

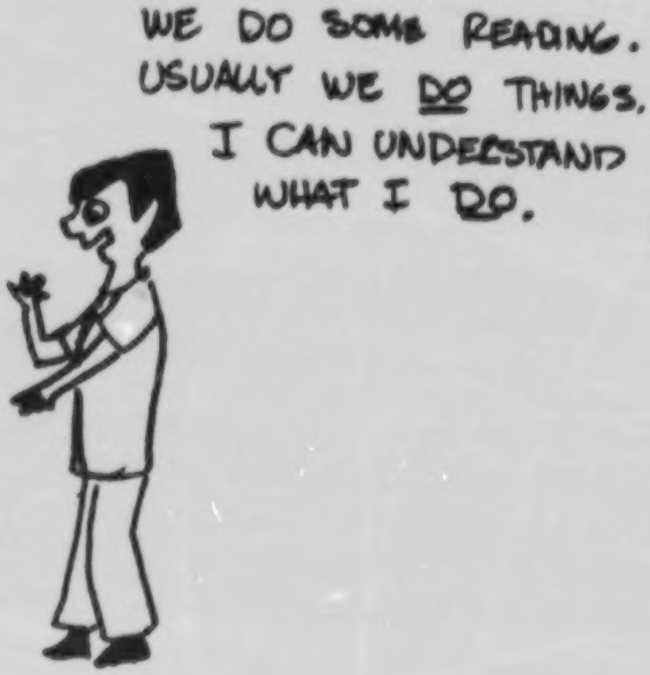
WAIT, LET ME LOOK AT THE BOOK.

DOES ANYBODY KNOW WHERE MY BOOK IS ???


MY TEACHER ALWAYS TALKS.-TALK -TALK-TALK


OUR TEACHER TALKS TOO, BUT SHE LETS US TALK TO EACH OTHER SOMETIMES. SHE LISTENS TO WHAT WE SAY. I THINK I'M IMPORTANT TO MY TEACHER.


WE READ ALL THE TIME IN MY SCIENCE CLASS. I WISH I COULD UNDERSTAND THE WORDS.


WE DO SOME READING. USUALLY WE DO THINGS. I CAN UNDERSTAND WHAT I DO.

PART 2 TERRESTRIAL (LAND) POPULATIONS

OBJECTIVES (WHERE PART TWO IS GOING)

At the end of Part Two the children should be able to:

- Recognize that an increase in the size of a population comes from that kind of plant or animal reproducing.
- Tell you what happens to a plant population when an animal population is in the same place.
- Recognize that the size of a population can increase or decrease because of environmental conditions.

ACTIVITY 5 SETTING UP AND OBSERVING TERRARIUMS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children are divided into groups. Each group sets up a terrarium. They observe the populations of plants that grow from the seeds they planted.

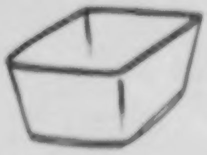
OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

When the children go outside to collect their own seeds, they get to observe plant populations around the school. They set up the terrariums in preparation for the next activity in which plants are needed. Also, the terrariums give them a chance to observe plant growth.

MATERIALS

For each group of four children:
- terrarium - read page 128 "TERRARIUMS"
- about thirty seeds - chinese cabbage or any other kind of seed
- lid or cover for the terrarium

For the class:
- masking tape
- soil
- several jars of water
- strips of colored paper
- sheets of paper



1 gal.

PREPARATION

Be sure there is a place in the room to place the terrariums. This place should be where they can get light.

TEACHING SUGGESTIONS

First Day-Talking About Terrariums And Collecting Seeds

1. Tell the children that their aquariums were substitute living place (habitats) for some freshwater organisms. Tell them that they can now build some substitute living places (habitats) for some organisms that live on land.

   Tell the children that this substitute living place is called a "Terrarium". Discuss the differences between an aquarium and a terrarium.

   "Are the organisms the same?"

   "Have you ever seen a terrarium?"

   "What do you think is needed to build a terrarium?"

2. Tell the children that the first thing the class will do is to start some plant populations in their terrariums. To find the seeds, the class will go outside and look at plant populations around the school. From these plants the children should collect the seeds they wish to plant in their terrariums.

3. Take the class outside to collect the seeds. Let the children keep the seeds in a piece of paper until the next lesson. You might discuss in class how many plant populations the children found that had seeds.

Second Day-Setting Up The Terrariums

1. Divide the class into groups of four students each. Let these four children work together in setting up the terrarium.

2. Show the class the steps in setting up the terrarium. Let them watch you set up one. Do the following:

   a. Put soil in the terrarium - about one inch deep.

   b. Put two small rocks somewhere in the terrarium.

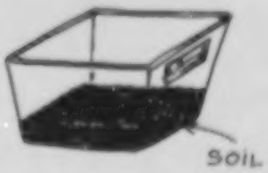
   c. Sprinkle some seeds on top of the soil - thirty seeds like chinese cabbage and some seeds from plants outside.

   d. Put a very thin layer of soil on the seeds.

   e. Sprinkle some water over the soil.

   f. Place the cover on the terrarium.

   g. Put tape on the terrarium for the children's names.



   Be sure the class understands the steps before you go on.

3. Let each group decide where they are going to get their soil. Give each group a terrarium and take the class outside to get soil.

4. When the class returns, let them set up their terrariums following the steps you demonstrated for them. You will have to give each group thirty seeds (like chinese cabbage) to use with the seeds they found outside.

5. After the groups have completed their terrariums, let the children place them together where they can get light.

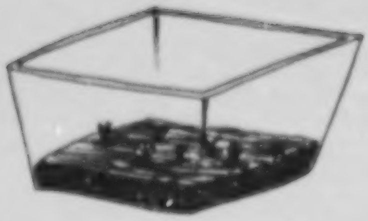
6. Tell the class they can water their terrariums every Monday and Friday. You will have to give them a few minutes on these days to do the watering.

Later-Things To Be Done As The Plants Grow

The following lessons are suggested to be done in short class sessions as the plants grow.

Suggested Lesson #1 - When the first plants appear in the terrariums, have an observation/discussion lesson.

"What changes have taken place?"



"How many populations of plants do you have in your terrarium?"

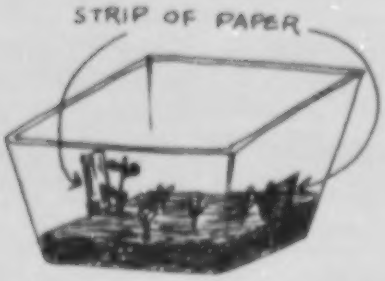
"What happened to the seed?" (Pull up a couple plants to observe.)

"Which part is the leaf? the stem? the root?"

"What can you see by observing the bottom of the terrarium?"

Suggested Lesson #2 - Tell the class they can measure how fast a plant grows if they want to.

"Which plants will grow the fastest?"



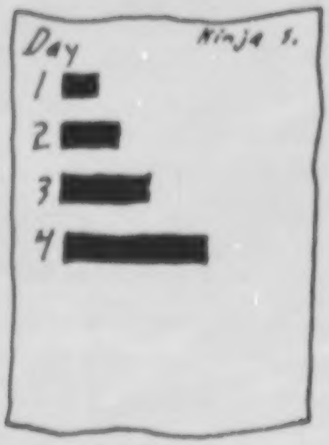
"Which plant grows the most in one day?"

Tell the children they can keep a record by making a graph. Here are the steps in making the graph.

a. Each student should pick one plant to keep a record of. Mark the plant with a piece of tape on the outside of the terrarium.

b. Each day cut a strip of paper the same length as the height of the plant.

c. Paste this strip of paper on a sheet of paper. This will make a graph that shows changes in height each day.



ACTIVITY 6 GRASSHOPPER AND SNAIL POPULATIONS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children add snails and grasshoppers to their terrariums. They observe the changes in the plant population caused by the grasshoppers and snails. They observe what the grasshoppers and snails do and how the male and female grasshoppers are different. They may see the grasshoppers or snails lay eggs. You can use other organisms in the terrariums, moth larvae or other plant eaters can be used as a substitute for grasshoppers or snails.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

By their observations the children are able to see what some animal populations do to plant populations. They also get a close up look at two familiar animals.

MATERIALS

For each child:
    magnifiers
    jar or bag

All other materials are collected by the children as part of the activity.

PREPARATION

The plants in the terrariums must be large enough to feed the snails and grasshoppers before you do this activity. When most plants are about an inch high, you can do this activity.

TEACHING SUGGESTIONS

First Day-Collecting Grasshoppers And Snails

1. Tell the children that today they will go outside and collect some animals to add to their terrariums. Each child should try and catch two grasshoppers and one snail. These snails are the land snails found around the school (called the African Snail).

2. Tell the class not to harm the organisms when they catch them. Give each child a container or bag to put his organisms into. Take the class outside to find the organisms.

3. When most of the children have found their organisms, let them come back to class and put the organisms into their terrariums.

Second Day-Observing The Grasshoppers And Snails

1. Let each group observe its terrarium. Give each child a magnifier.

2. Walk around the class and informally discuss the terrariums with each group. Let the children discuss and ask questions. Here are some suggested questions to use as you go from group to group.

   "Has the plant population changed?"

   "Are the grasshoppers different from each other?"

   "Can you see the parts of the grasshopper and snail?"

   "Do they make any noise?"

   "How do they move?"

3. Remind the children that the terrariums should be watered every Monday and Friday.

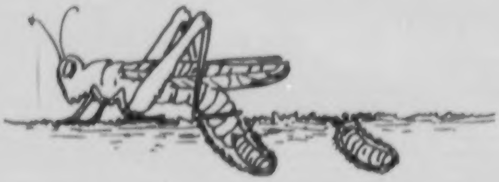
Third, Fourth, And Fifth Day-Short Observation Periods If The Children Are Interested

During these days the children might observe their terrariums for a few minutes each day. Do this if they are interested. Keep the discussions informal.

Here are some of the things the children might observe during this time.

Female grasshoppers laying eggs:

Children may see the female grasshoppers putting their tail (egg-laying tube) into the soil. They may tell you that they are "laying eggs." Do not tell the children that young grasshoppers will come from the eggs.



Organisms may die - leave the organisms in the terrariums and ask the children what they think will happen to the dead animals.

Plants may disappear - Ask the children what they think caused this.

Sixth Day-Observation And Discussion Of The Terrariums

1. Have a class discussion after each group has its terrarium.

   "Have the plant populations changed?"

   "Did all the plant populations changed?"

   "Which changed the most?"

   "What caused the changes?"

   "Have the animal populations changed? How?"

   "What do you think will happen to the terrariums?"

   "Can you tell which is the male and female grasshopper?"

   "How many populations do you now have in the terrariums?"

2. You will need the terrariums if you choose to do Activity 10.

   You will not need the terrariums if you choose to do Activity 10A.

   Decide which of these two activities you will do. Keep the grasshoppers in the terrariums if you choose Activity 10. Activity 10 uses the lizards. Cleanup the terrariums if you choose to do Activity 10A using the ant lions.

   If you keep the terrariums, put them in a safe place where the plants can continue to grow.

   If you cleanup the terrariums, let the children do it under your direction.

ACTIVITY 7 WATCHING POPULATIONS CHANGE OUTSIDE THE CLASSROOM

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children find populations of insects growing on plants outside the classroom. They count how many insects are on a selected part of the plant. They go back to this same plant and count the insects each week for three weeks. They discuss reasons for the populations changing.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

In this activity the children can observe population change in a natural situation. If they find the right insects, they should see rapid population changes due to reproduction. They should also be more aware of insect populations around them and that these populations change.

MATERIALS

For each child:
- magnifier
- Population Record worksheet

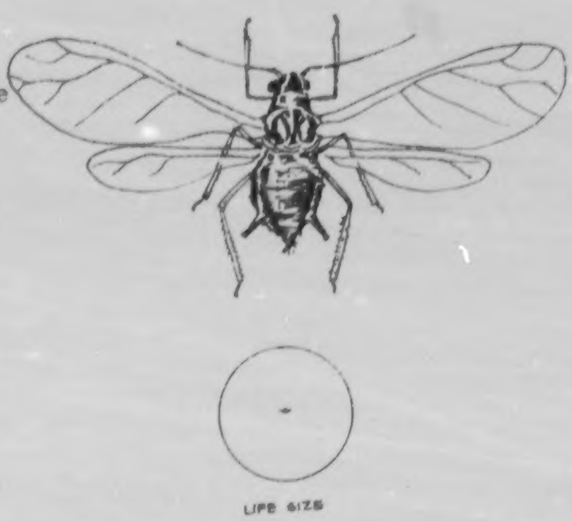
INFORMATION FOR THE TEACHER

There are several kinds of organisms that are good for this activity. These organisms can be found on most island. These organisms are good ones to observe because the populations change quickly.

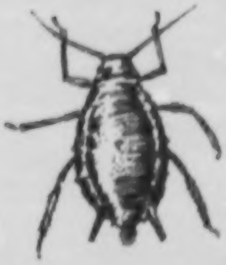
Organism suggestion #1 - aphids

Aphids are small insects that live on plants. They have mouthparts like a needle which makes a hole in the stem or leaves of the plant. The aphids feed on the plant juices.

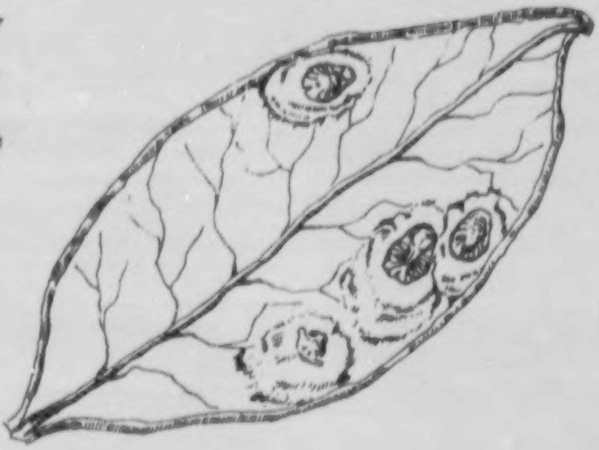
Some aphids have wings and some do not. Sometimes the young aphids develop inside the body of the female and are born alive. After coming out of the mother, the young attach themselves to a stem or leaf. They start feeding on the plant's juices.



Aphids are different colors. You may find green, yellow or black aphids. Special kinds of aphids live on special plants. For example: you may find one kind of aphids living on bean plants and a different kind living on a ginger plant.



Organism suggestion #2 - scale insects or mealybugs



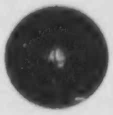
The scale insects are of many kinds and can be found on many different plants.

The adult female stays in the same place. This makes them a good organism to observe for this activity.

The adult female has many eggs. She may have a hard body (scale covering) or a soft covering. Both kinds of coverings are found in the Trust Territory.

The mealybug insect is like the scale insect, but the mealybug always has a soft body.

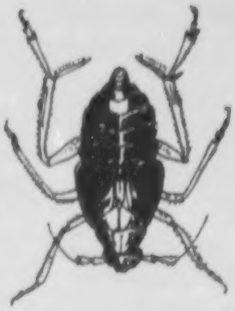
These insects feed on plant juices like the aphids. They have piercing and sucking mouth parts.



Life size

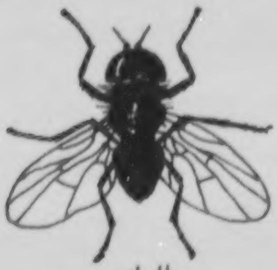
Organism suggestion #3 - taro leafhopper

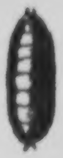
There are many kinds of leafhoppers. We are suggesting the "taro leafhopper" because it does not move away (hop away) when you observe it. It can be found on taro.

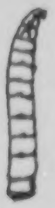


These insects feed on plant juices like the aphids. They have piercing and sucking mouthparts.

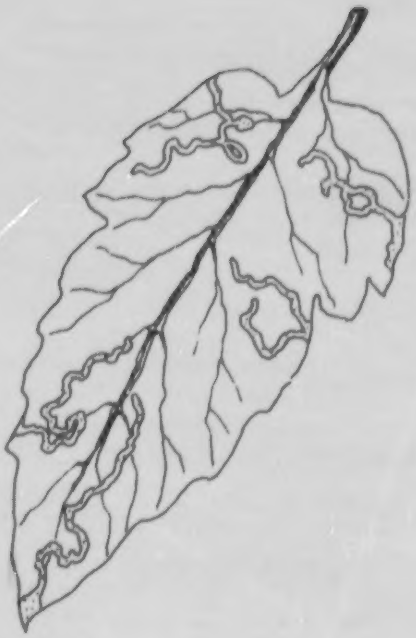
Organism suggestion #4 - leaf miners







It is hard to see the leaf miners, but it is easy to see where he lives. The larvae of the leaf miner lives inside leaves. The larvae eat the middle part of the leaf. When you look at the leaf you can see the places inside the leaf where the leaf miner ate.



This is a good insect to observe because they live on many kinds of plants, are found throughout the Trust Territory and can be counted. You will have to count the damaged places on the leaves as evidence that a leaf miner is there.

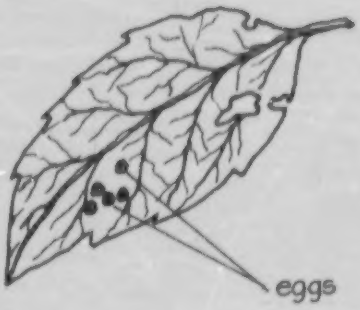
If you are very careful you can pick the leaf miner larva out of the leaf to see it. Just look at the end of the leaf miner trail on the leaf. Use a pin to pick the larva out.

NOTE: The following suggestions (#5, 6, 7, 8 and 9) are organisms that could be brought into the classroom to observe for population changes.

Organism suggestion #5 - moth or butterfly eggs

The children might find the eggs. These could be brought into the classroom and observed for changes. The class could observe how many organisms hatch.

Sometimes eggs can be found on leaves.



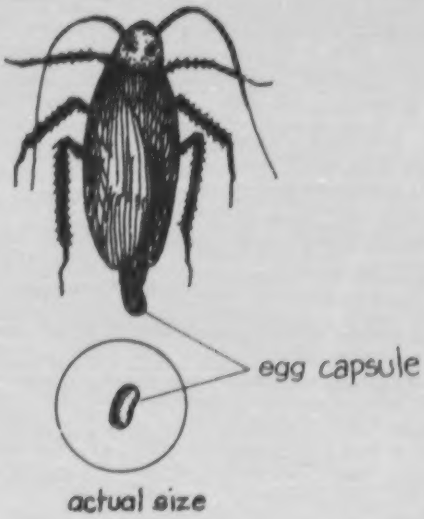
Organism suggestion #6 - cockroach egg capsules

Cockroaches can be found everywhere. They lay their eggs in groups of 15 to 40 eggs. This is called an egg capsule. The cockroach may carry the egg capsule around before putting it down to hatch.

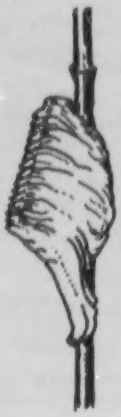
You can look for egg capsules in dark, moist places and under rotting wood.

You could raise the organisms after they hatch. Keep them in a jar with some food and a little water. Put in some paper for them to hide under.

The cockroach can carry disease because it runs over the food people eat. It can carry germs from some other place to the food. The cockroaches you raise from eggs will not carry disease unless you let them go. It is best to destroy the cockroaches after you are finished observing them.



Organism suggestion #7 - praying mantis egg capsules



The praying mantis lays its eggs together in capsules. They glue these capsules to branches. The capsules are brown and look like styrofoam.

These are good to observe because so many small praying mantis hatch from the egg capsule.

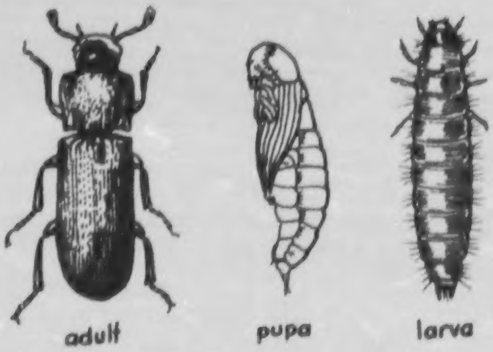
The praying mantis is a very beneficial insect. It eats many of the insects that are plant pests. Do not kill praying mantis. After the young mantis hatch, let them go quickly before they starve and die.

Organism suggestion #8 - stored grain insect pests

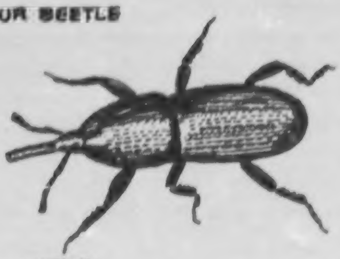
Many insects live in grain like rice or grain that is made into flour. They can also be found in cereals, noodles, crackers and cookies.

Put the insects and the food they are in into a jar. Count the number of insects in the jar. Count the number of insects in the jar each week to see how the population is changing.

Most of these insects are beetles and weevils. You may find different life stages.



FLOUR BEETLE



RICE WEEVIL

Organism suggestion #9 - spider egg sacs

The spider is not an insect like all the other organism suggestions, but the class can watch the spider egg sacs hatch. The egg sacs can be placed in a jar for observation.

The spider eggs are covered with a silken sac. The egg sacs can be found in webs, on plants, under rocks and in rotting wood. Sometimes spiders can be kept in a jar and will lay eggs in the jar.

Spiders are beneficial organisms because they eat many insects. Do not kill them. Let them go outside after you are finished observing them.

TEACHING SUGGESTIONS

First Day Of the First Week - Finding And Recording A Population

1. Explain to the class that they will go outside to find a population of organisms living on a plant. They will probably find insect populations. Each group should find their own population. This population should be small enough to count. It could be the population found on one whole plant. It could be the population found only on one branch or leaf of a plant.
2. Give each child a Population Record worksheet. They can draw the organism, put down the number of organisms in the population and draw the plant they found the population on.
3. Explain to the class that they will observe this same population each week to see if it changes.
4. Divide the class into groups of four students each. Each group will work with a different population.
5. Give each child a magnifier.
6. Take the class out to find and record populations.

One Day Of The Second Week - Observing The Populations For Change

1. Each group should have the Population Records from the first observation.
2. Take the class out to observe and record the same populations.
3. Discuss the Population Records after returning to the classroom.

"Did the population increase? Decrease?"

"What do you think caused the change?"

"Do you think the population will change more?"

One Day Of The Third Week - Observing And Recording The Populations For Change.

1. Each group should have the Population Record from the other observations.

2. Take the class out to observe and record the same populations.

3. Discuss the Population Records after returning to the class.

"Did the populations increase? Decrease?"

"What do you think caused the change?"

OPTIONAL ACTIVITY - OBSERVING POPULATIONS IN THE CLASSROOM

The class might find organisms like those in suggestions #5, 6, 7, 8 or 9. They can bring these into the classroom in jars. They can observe them for change.

OPTIONAL ACTIVITY - GRAPHING THE POPULATION CHANGES

Each group could keep a graph of its population. This is a good way to see population changes. Look at page 20 for ideas on how to make a graph.

Name____

Picture of one organism from our group's population.

Picture of the place the population lives.(leaf, branch, or whole plant)

	number of organisms
1st. observation	
2nd. observation	
3rd. observation	

ACTIVITY 7 POPULATION RECORD

ACTIVITY 8 FRUIT FLY POPULATIONS

SYNOPSIS (WHAT YOU WILL BE DOING)

A population of fruit flies is started in the classroom. Children observe the population change. They talk about what made it change.

OVERVIEW OF THIS ACTIVITY (WHY YOU ARE DOING THIS)

One of the things in the environment that causes populations to change is the food supply. In this activity the children can observe what happens when the food is gone. Fruit flies are interesting to watch. They change in number very quickly. It is easy for the children to see the connection between the food and the population change.

MATERIALS

For each child:
"Fruit Fly Population Record"

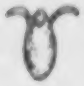
For each group of four students:
aquarium with cover
or a jar with a lid
paper towel
small piece of cotton
piece of banana or breadfruit,
papaya, pandanus, pineapple

For the class:
masking tape
several containers with lids for collecting fruit flies

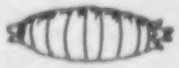
INFORMATION FOR THE TEACHER-WHAT ABOUT FRUIT FLIES?

Fruit flies are small, harmless insects. They can be found on almost all islands in Micronesia. They are found near decaying fruit. Their life is made up of four stages:

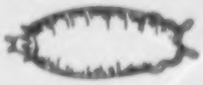
1. egg (small and hard to see)



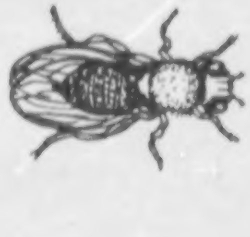
2. larva (small and wormlike)



3. pupa (yellow, can be found attached to side of jar)



4. adult fruit fly (about 1/8" long, lives for about two weeks)

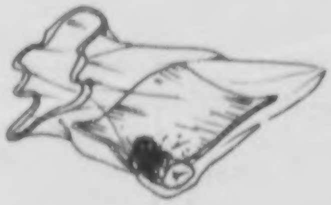


PREPARATION

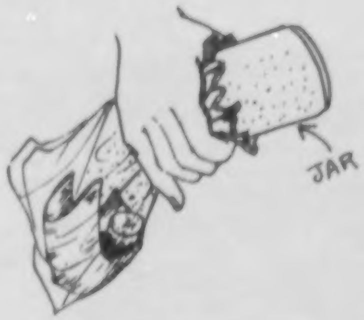
You need to get around 30 or 40 fruit flies to start this activity. Here are some suggested ways of getting the fruit flies. You could do it. The children could do it. You decide which way is best for your class.

Suggestion #1 - Collecting Fruit Flies

Put the piece of fruit and a piece of paper towel in several plastic bags. Hang the bags up where you think there are some fruit flies. Leave the bags open.



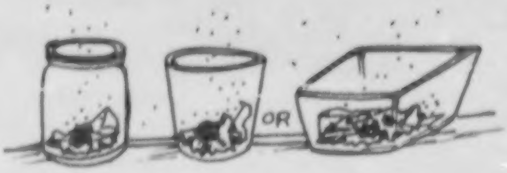
After you have some fruit flies, close the bag. In a week you will have many fruit flies in the bag. If there are enough flies in the bag already you can use it now.



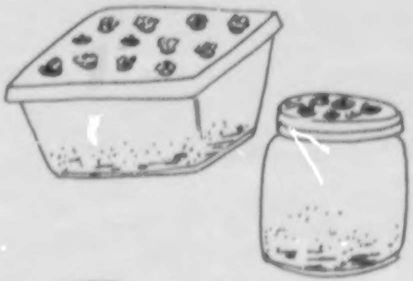
It is easy to put these flies into jars for the children.

Suggestion #2 - Collecting Fruit Flies

Put a piece of fruit and a piece of paper towel into several jars or aquariums. Set the jars or aquariums where you think there are some fruit flies.

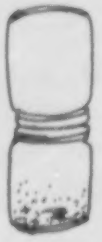


After you have some fruit flies, close the jar or aquarium. The cover should have some holes in it. Put cotton in the holes. This allows air to come in.



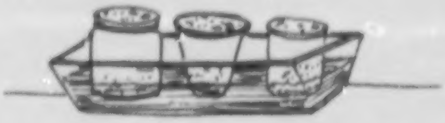
If you have enough flies you can use them now. If you want more, wait a week and the population in the jar will increase.

You can get the flies into other jars. Put a second jar over the jar with the flies. Pull the cotton out of the lid or take the lid off. Make the bottom jar dark. The flies will go into the top jar.

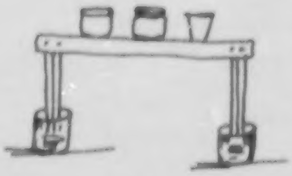


Be careful. Ants like the fruit fly food in the containers. If the ants get into your containers, you could do the following to keep them out.

Put the containers in water.



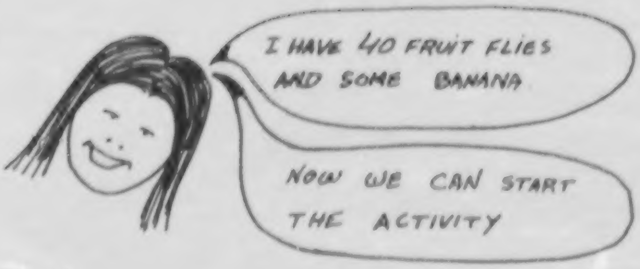
OR



Put the legs of the table in cans of water. Add a little bit of kerosene to the water if you want.

When you have enough flies you are ready to start this activity. You will need some more fruit.

MISS PREPARED SAYS:


I HAVE 40 FRUIT FLIES AND SOME BANANA
NOW WE CAN START THE ACTIVITY

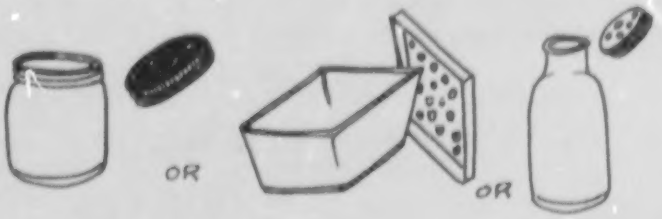
TEACHING SUGGESTIONS

First Day-Starting the Fruit Fly Population

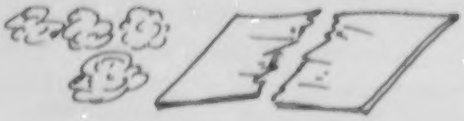
1. Tell the class that today they will start a fruit fly population.

2. They will observe this population for several weeks to see what happens to it. Divide the class up into groups of four children.

3. Give each group:
   - a container with a lid,



   - cotton for the holes in the lid,
   - half a paper towel,



   - a piece of fruit (fruit fly food)

4. Let each group prepare the container for the flies. They should put the towel and food in the container. The cotton goes in the holes in the lid.

5. Show each group how to put fruit flies into their container. Tell them to put *five* flies into their container. The PREPARATION shows how to put the flies from one container into another container.

6. Let each group label its container. Use masking tape. Let them tape the top on the container. Tell the children that the container will not be opened until the activity is over.

7. At the end of the period, put the containers in a safe place.

Second Day-Counting and Observing the Fruit Flies

1. Give each child a "Fruit Fly Population Record". Tell them to count the number of fruit flies in their container. Let them write down the date, and number of flies on their record.

Students Name: ______________________

Group: ______________________

Fruit Fly Population Record

Date	Number of fruit flies
Feb. 3	5
Feb. 3	or 𝍸

2. Let the children observe the fruit flies. Give them magnifiers. Let them talk about their observations. At the end of the period, put the containers in a safe place. Put the student's records in a folder.

Later Lessons-Observing and Recording the Fruit Fly Population

Let the children observe and record every Monday, Wednesday and Friday.

Monday		Wednesday		Friday
observe record	☒	observe record	☒	observe record

The time you spend each day depends on how interested the children are. If nothing is happening, the lesson may be short that day. If different stages of life cycle appear or the population changes, the children could spend a long period observing, recording and discussing.

You can continue observing and recording for about three or four weeks. Let the student's interest be your guide.

1. Let each group get its container. Give each child a magnifier and his "Fruit Fly Population Record".

2. Ask them to record the number of fruit flies on their record. Let them discuss any observations they make.

3. You may want to do the OPTIONAL ACTIVITY about the life cycle of the fruit fly if the students are interested. The OPTIONAL ACTIVITY is at the end of this Activity.

4. Here are suggested questions to use while the children are recording, discussing and observing. Use them when you need them.

   "Is the population larger or smaller today?"

   "What do you predict will happen to the population in two more days? In one more week? In one month?"

   "Why is the number of flies changing?"

   "What could be done to make the fruit fly population larger?"

5. Put the children's records back in the folder at the end of the lesson.

Last Lesson-Cleanup

When the activity is finished, let the children cleanup the containers. They should be washed so you can store them. Guide the children in doing the cleanup.

Let the children keep their records.

OPTIONAL ACTIVITY - FRUIT FLY LIFE CYCLE

Observe the fruit fly containers each day. Draw the organisms in the container. Make a new drawing when a change takes place.

Discuss questions like:

> "Where did that different looking organism come from?"
>
> "What do you predict will happen next?"
>
> "Which stage of the organism was in the container first?"
>
> "How many days does each stage last?"

You might want to show the class the film "Life Cycle of the Monarch". This film shows the egg stage in a life cycle. The fruit fly eggs are small and hard to see.

For further information look at the Science For Micronesia unit "Life Cycles". It has an activity on the "Life Cycle of the Fruit Fly" in it.

NAME ______________________________

GROUP ______________________________

FRUIT FLY POPULATION RECORD

DATE	NUMBER OF FRUIT FLIES

ACTIVITY 8

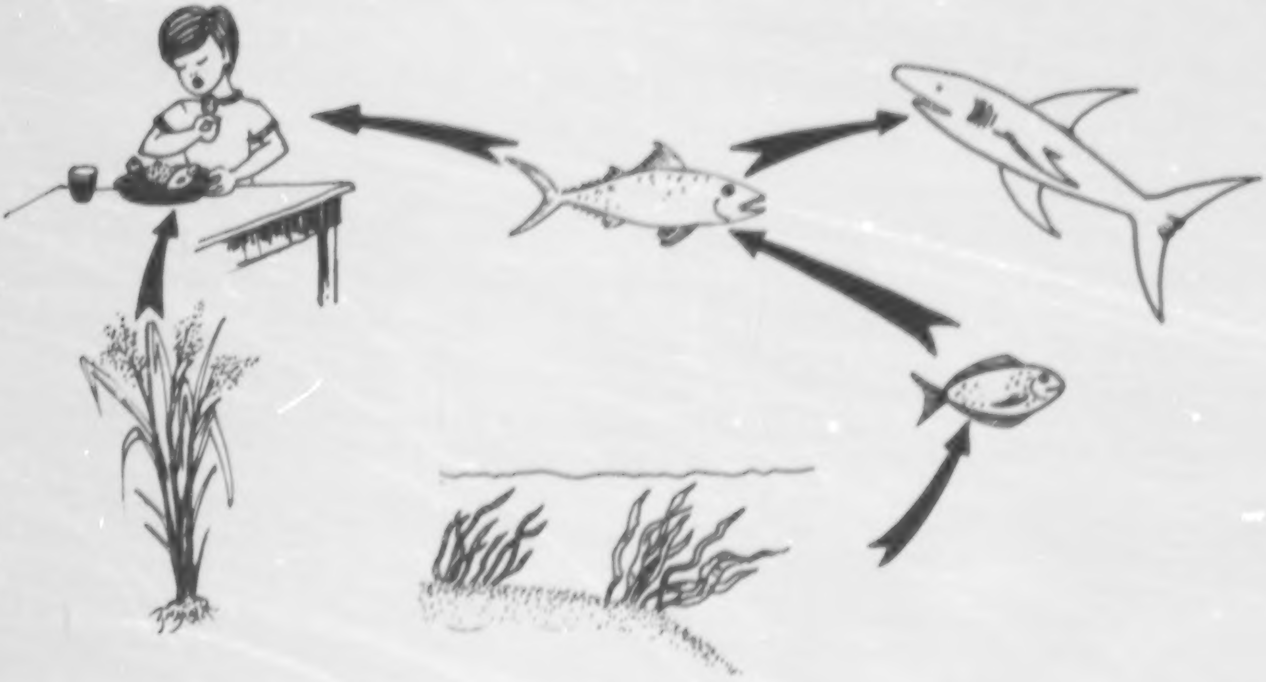
PART 3

FOOD RELATIONSHIPS

OBJECTIVES (WHERE PART THREE IS GOING)

At the end of Part Three the children should be able to:

- Identify an animal as a Plant eater, an Animal eater, or a Plant-and-animal eater.
- Identify animals as predators or prey.
- Recognize that human food comes from plants and animals.
- Identify food chains.
- Recognize that all food chains start with green plants.
- Recognize that food chains connect to make a food web.



ACTIVITY 9 PLANT EATERS AND ANIMAL EATERS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children look at a lagoon-beach picture showing plants and animals. They talk about what these animals are doing. The words plant eater, animal eater and plant-and-animal eater are introduced. The children make a bulletin board showing plants and animals. They discuss the bulletin board pictures.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

The children's aquariums and terrariums should have given them experience showing what organisms eat. This activity uses this experience to discuss what animals eat. This activity prepares them to talk about predator/prey relationships in the next activity.

This activity might also point out concepts that need to be worked on before you do the next activities. Check and see if the students can handle the concepts of: plant, animal, and organism. If you find they are having trouble, do some of the OPTIONAL ACTIVITIES.

MATERIALS

For each child:
- lagoon-beach picture
- green crayon
- red crayon
- black crayon
- other colors of crayons

For the class:
- paper
- bulletin board or space on a wall
- masking tape
- lagoon-beach overhead transparency (optional)

PREPARATION

You will need a large space for the children's pictures on the Second Day. Use a large bulletin board or an empty space on the wall. Have some tape or a stapler ready to put up the pictures. Prepare the place for the pictures after the First Day.

TEACHING SUGGESTIONS

First Day-What Eats What In The Lagoon-Beach Picture

1. Give each child a lagoon-beach picture.

   You may put the transparency on the overhead projector if you wish. You do not need it, but it could be used as a large picture for you to point to. If you have the transparency and you want to use it, then use it.

2. Say to the class: "Names as many organisms as you can in the picture." Let the children name most of the organisms.

3. Ask the children to color the plants green.

4. Ask the children to look for animals that are eating the plants. Tell them to circle these animals with the red crayon.

   Tell the children that these animals are called PLANT EATERS.

5. Ask these questions:

   "Are there any animals that are not circled?"

   "What are these animals eating?"

6. Ask the children to circle all animals that are eating other animals with the black crayon.

   Tell the children that these animals are called ANIMAL EATERS.

7. Ask these questions:

   "Are there any animals in the picture that eat both plants and animals?"

   "Can you think of other animals that eat both plants and animals?"

   "What about the animals in your aquariums and terrariums?"

   Tell the children that these animals are called PLANT-AND-ANIMAL EATERS.

8. Collect the lagoon-beach pictures. Keep them for a later activity.

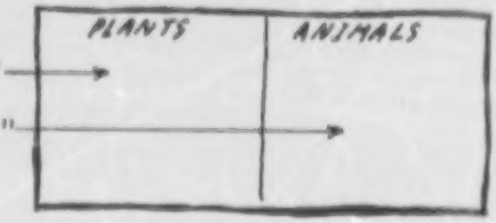
Second Day-Making A Bulletin Board

1. Show the class the bulletin board. The bulletin board has two parts. Each part is labeled as below.

2. Tell the class:

   "This part is for pictures of plants."

   "This part is for pictures of animals."



3. Give each child two sheets of paper.

   Ask them to draw a picture of a plant on one sheet and a picture of an animal on the other sheet of paper.

4. Let the children put their picture on the bulletin board.

5. When all the pictures are on the bulletin board, ask the class:

   "Can you show which animals are PLANT EATERS?"

   "Can you show which animals are ANIMAL EATERS?"

   "Can you show which animals are PLANT-AND-ANIMAL EATERS?"

   Let the children use their pictures to answer these questions.

6. Leave the bulletin board up because you will use it in a later activity.

OPTIONAL ACTIVITIES-WHAT IS AN ORGANISM? A PLANT? AN ANIMAL?

You may wish to do this if your children are having difficulty with the concepts of ORGANISM, PLANT and ANIMAL.

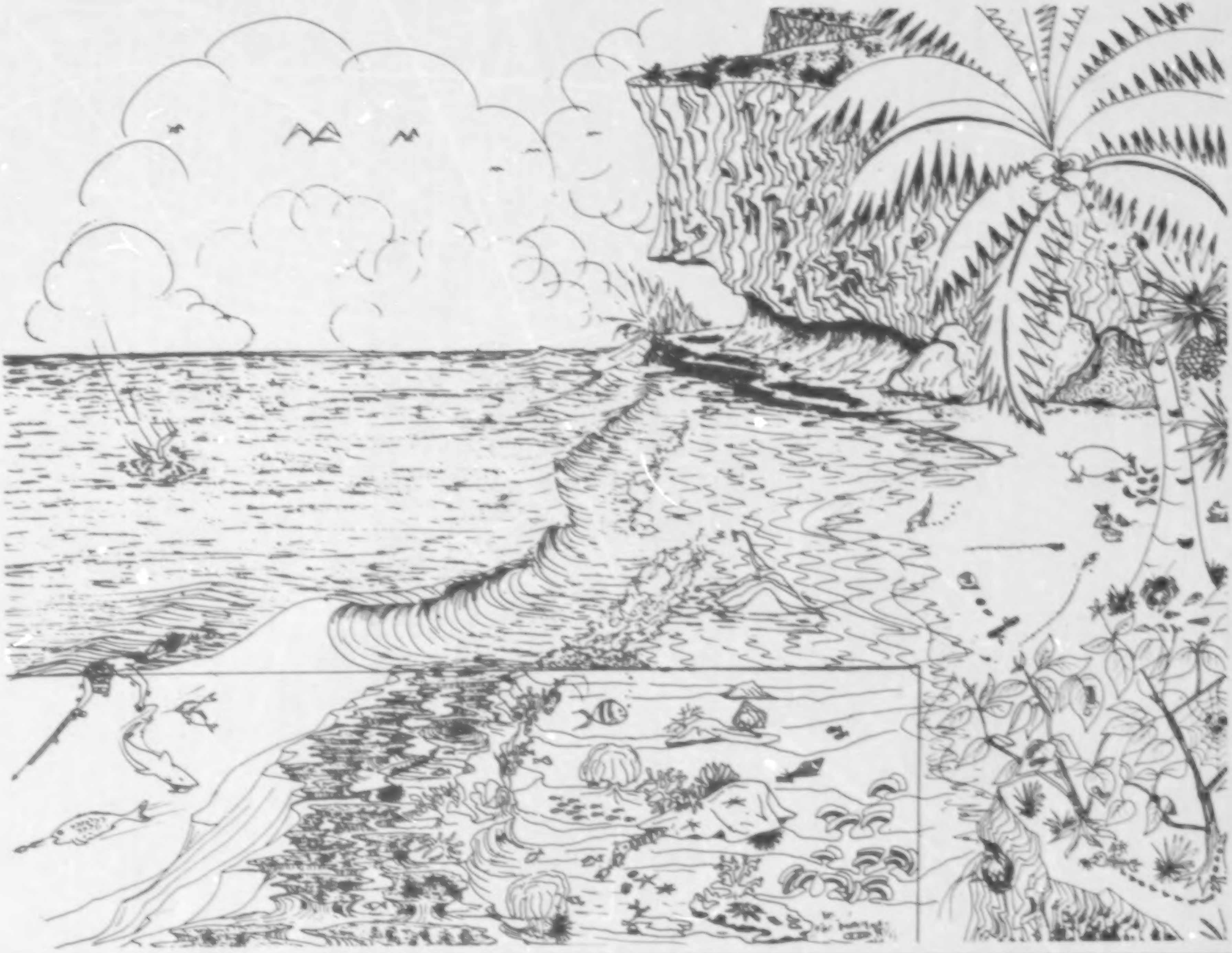
1. Talk about all the organisms they have observed this year in the aquariums and terrariums.

   Which of these organisms were plants? Which were animals?

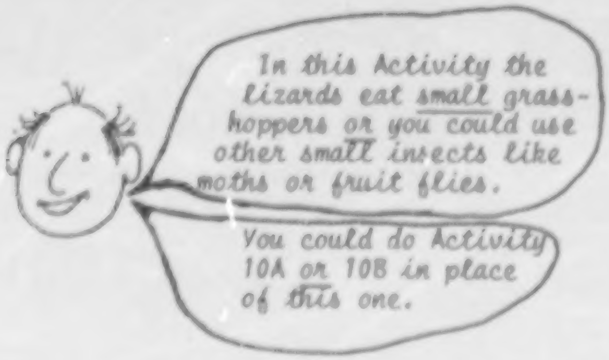
2. If yhe children are really having trouble with PLANT and ANIMAL, you can do the "Life Cycles" activity called "Plant or Animal?".

   This "Plant or Animal?" activity will take several days.

   Do not expect the children to have a complete understanding of the difference between a plant or an animal. They should be able to tell you if the common organisms on the island are plants or animals.



Mr.
PLANNING SAYS:


In this Activity the lizards eat small grasshoppers or you could use other small insects like moths or fruit flies.
You could do Activity 10A or 10B in place of this one.

ACTIVITY 10 PREDATOR-PREY RELATIONSHIP (LIZARDS AND GRASSHOPPERS)

SYNOPSIS (WHAT YOU WILL BE DOING)

The children put lizards into their terrarium.. They watch the lizards eat the grasshoppers. After this observation, the teacher introduces the PREDATOR-PREY concept. The children discuss other examples of PREDATOR-PREY. They use the bulletin board from Activity 9 in their discussion. The children discuss how the PREDATOR catches the PREY. They discuss how the PREY escapes from the PREDATOR.

OVERVIEW OF THIS ACTIVITY (WHY YOU ARE DOING THIS)

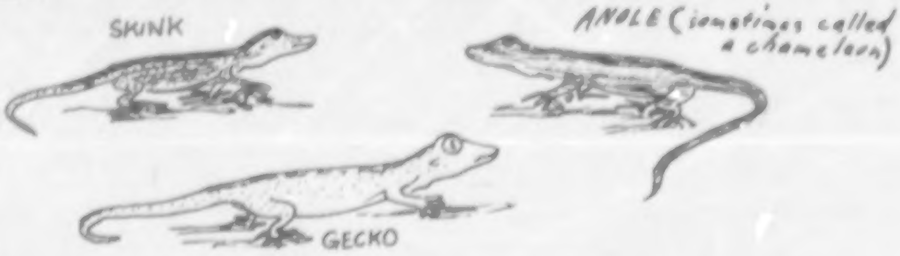
This activity gives actual experience in seeing the PREDATOR-PREY relationship. This starts them talking about times when they have seen a PREDATOR eat the PREY.

When the children understand PREDATOR-PREY, they are ready to go on to the activities on FOOD CHAINS.

MATERIALS

For each group of four children:
- this group's terrarium and grasshoppers from Activity 6
- several lizards (gecko, skink, anole)
- jars with lids or plastic bags to catch the lizards in.

For the class:
- masking tape
- jar with water
- paper
- string


SKINK
ANOLE (sometimes called a chameleon)
GECKO

PREPARATION

Check the terrariums. There should be five or more small grasshoppers or other small insects in each terrarium. Plan to collect the insects you need on the First Day. Different lizards like different insects. For example a gecko might eat small moths in place of grasshoppers.

You can choose one of the following ways to get your lizards. Each terrarium should have at least two lizards. The anole lizards are one of the best to use, if you can find them.

Suggestion #1	The teacher collects the lizards.
Suggestion #2	A group of volunteer children collect the lizards after school.
Suggestion #3	Each child is responsible for bringing a lizard to put in his group's terrarium.
Suggestion #4	Take the class outside during science class to catch the lizards.

TEACHING SUGGESTIONS

First Day-Getting the Terrariums Ready

1. Let each group get its terrarium.

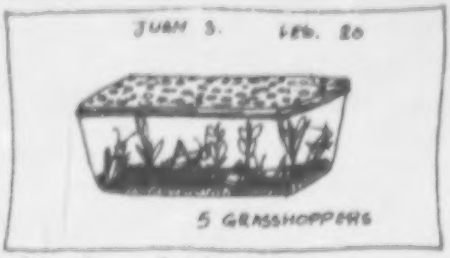
   Tell the class, "Tomorrow we will add a new organism to the terrariums. Today we will get it ready."

2. If each terrarium doesn't have five small grasshoppers or other small insects, take the class out to get more.

3. Tell the class, "We need a record of what is in your terrarium now. Draw what you see in your terrarium. Put down the Date and the Number of grasshoppers you have."

   Give each child a piece of paper. Let them make their record.

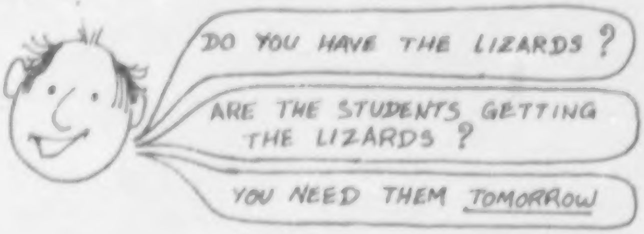
   Examples:



   Collect the papers and put them in a folder.

4. How are you going to get the lizards? If the children are going to get them, you MUST make plans now. The lizards should be in class for the Second Day lesson.

Mr.
PREPARED SAYS:


DO YOU HAVE THE LIZARDS ?
ARE THE STUDENTS GETTING THE LIZARDS ?
YOU NEED THEM TOMORROW

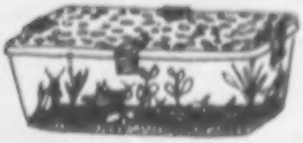
Second Day-Putting the Lizards in the Terrariums

If you decided to take the class out to get the lizards, do it now. Put the lizards in the terrariums tomorrow.

If you or the students have the lizards, do the following now.

1. Tell the children to get their terrariums.

2. Let the children put the lizards into the terrarium. Tell them:



"Be careful to not let the lizards or insects get away."

"Tape on the cover after the lizards are inside."

3. Give each child his drawing from the First Day. Tell them:

"Make a drawing of what you put into the terrarium today."

"Talk quietly and move slowly. We don't want to scare the lizards while we observe them."

"Observe closely while you do your drawing."

4. Sprinkle a little water on the inside of each terrarium for the lizards to drink.

WAIT - You should not do the next lesson until some grasshoppers are eaten by the lizards (PREDATOR).

Maybe the lizards will eat the grasshoppers you put with the lizards into the terrarium.

Maybe the lizards will eat the grasshoppers when the students can't see it. (at night). If this happens, they may have some idea what happened to the grasshoppers. Let them discuss their ideas.

GO ON TO THE NEXT LESSON WHEN the students have decided that the grasshoppers are being eaten by the lizards. It is hoped that some students saw this happen.

If the students do not decide the lizards are eating the grasshoppers, you could put some fruit flies in the terrariums. Let the class watch the lizards eat the fruit flies.

WHEN THE STUDENTS DECIDE THE LIZARDS ARE EATING THE OTHER ANIMALS IN THE TERRARIUM, DO THE NEXT LESSON.

Later Lesson-Inventing the Terms PREDATOR and PREY

1. Let the children tell what happened in their terrariums.

2. Tell the children:

   "Any animal that catches and eats another animal is called a PREDATOR."

   Write the word PREDATOR on the chalkboard.

   "Any animal that a PREDATOR eats is called the PREY."

   Write the word PREY on the chalkboard.

   Have the class say PREDATOR and PREY several times.

3. Ask the children:

   "Which animals in your terrariums are PREDATORS? Which are PREY?"

   "Can you think of other examples of PREDATORS and PREY?"

4. Tell the children to look at the bulletin board. Look at the animals they drew. Ask:

   "Which of these animals are PREDATORS?"

   "What is the PREY of the PREDATORS?"

   "Which of these animals are PREY?"

   "What PREDATOR eats them?"

5. Let the children connect string between PREDATOR and PREY pictures on the bulletin board. They should tell you which animal is the PREDATOR and which animal is the PREY.

Next Lesson-Talking About PREDATOR and PREY

1. Ask three people to draw a picture of an animal. The animals must be different.

   Tape the three animal pictures on the chalkboard.

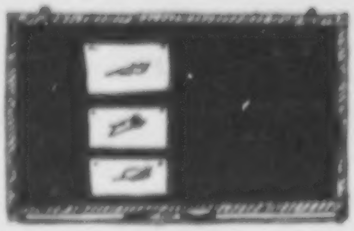
   Ask the class: "Can you think of an animal that might eat one of the animals in the picture?"

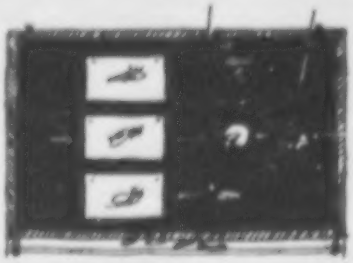
   Let a volunteer draw a picture of the animal on the chalkboard (use chalk).

   Ask: "Which animal is the PREDATOR and which is the PREY?"

   Have a student connect the PREDATOR and PREY with a chalk line.

   Do this with other volunteers until the board has many pictures and lines on it. Always ask the children to tell which is the PREDATOR and which is the PREY.





2. Ask the children:

   "How can the PREY escape?"

   "Does the PREDATOR always catch the PREY?"

   "How does the PREDATOR catch the PREY? Can you give examples?"

   Let the class discuss these questions. Let them talk about animals they are familiar with. They might also talk about animals they have heard about, but have never seen.

Last Lesson Clean-up

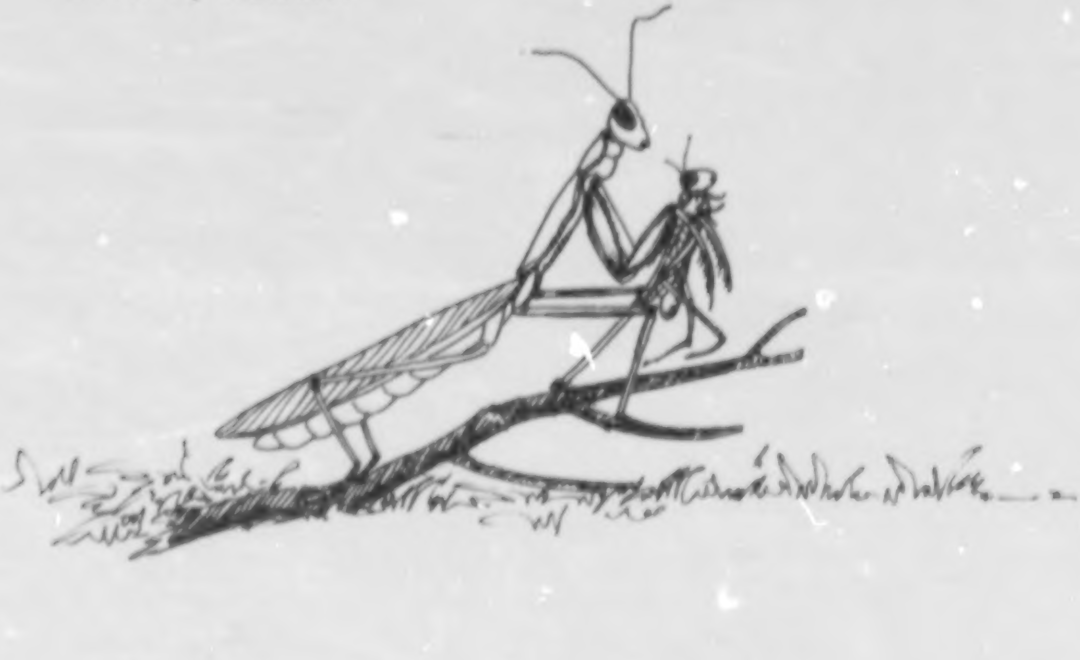
Let the children clean-up the terrariums. You supervise, but let them do it. The organisms can be put in the school playground. Some children may want to take lizards home. Store the terrariums after they are washed and dried.

OPTIONAL ACTIVITY - CLASSROOM GAMES

You or the children might make up games to play in the classroom. These games could show the predator/prey relationship. The children could act like different animals.

OPTIONAL ACTIVITY - WALK AROUND THE SCHOOL

You might take the class on a walk to find examples of PREDATORS and PREY. For example: ants, spiders, crabs and other animals are easily observed.



ACTIVITY 10A PREDATOR-PREY RELATIONSHIP (ANT LIONS AND ANTS)

YOU CAN DO THIS ACTIVITY IN PLACE OF ACTIVITY 10 OR YOU CAN DO THIS ACTIVITY AS AN OPTIONAL ACTIVITY AFTER YOU DO ACTIVITY 10.

SYNOPSIS (WHAT YOU WILL BE DOING)

The children get some ant lions in a container. They watch the ant lions eat ants. After this observation the teacher introduces the PREDATOR-PREY concept. The children discuss other examples of PREDATOR-PREY. They use the bulletin board from Activity 9 in their discussion. The children discuss how the PREDATOR catches the PREY. They discuss how the PREY escapes from the PREDATOR.

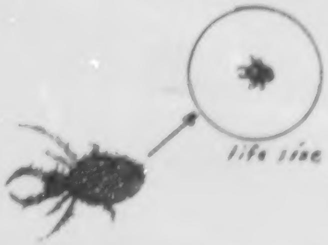
OVERVIEW OF THIS ACTIVITY (WHY YOU ARE DOING THIS)

This activity gives actual experience in seeing the PREDATOR-PREY relationship. This starts them talking about times when they have seen a PREDATOR eat the PREY.

When the children understand PREDATOR-PREY, they are ready to go on to the activities on FOOD CHAINS.

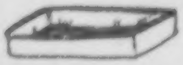
MATERIALS

For each child:
- ant lion
- jar and lid
- magnifier



For each group of four children:
- terrarium or can or tray
- sand

For the class:
- masking tape
- paper
- string



PREPARATION

You can choose one of the following ways to get your ant lions. Each child should have an ant lion in his group's terrarium.

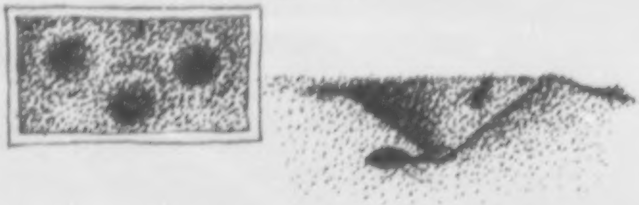
Suggestion #1 The teacher collects the ant lions

Suggestion #2 A group of volunteer students collect the ant lions after school.

Suggestion #3 Each student is responsible for bringing an ant lion to put in his group's terrarium.

Suggestion #4 Take the class outside during science class to catch the ant lions. Be sure you know there are some close to the school before you do this.

You can find ant lions in sandy soil. Look for the holes they make and you will find them at the bottom under the sand.



TEACHING SUGGESTIONS

First Day-Putting Ant Lions in the Terrariums

If you decided to take the class out to catch the ant lions, do it now. If you already have the ant lions, start the activity.

1. Divide the class into groups of four. Give each group a terrarium and some sand. The sand should be an inch deep.

2. Give each child an ant lion, magnifier and jar lid. Let them put the ant lion in the jar lid to observe it. Let the children discuss their observations with their group.

3. Near the end of the science period, tell the children:

   "Put your ant lions into your group's terrarium."

   "What is the ant lion doing in the terrarium?"

4. Put the terrariums in a safe place.

Second Day-Putting Ants in the Terrariums

1. Tell the children that today ants are going to be added to their terrariums.

   Each group will be responsible for catching some ants for that group's terrarium. Each group will need around ten ants.

   Let the children take jars and lids outside to catch the ants.

2. After the children have their ants, ask one person from each group to get their terrarium. Ask them to be very careful with the terrarium. The children should not shake the terrarium.

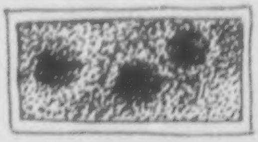
3. Ask: "Has the terrarium changed?"

   "How many ant lions did you put into your terrarium?"

NOW IT HAS HOLES IN THE SAND

4. Tell the children to put three ants into each terrarium.

   Let the children observe and discuss their terrariums for the rest of the period.



   The children should see the ants being caught by the ant lions.

Third Day-Inventing the Terms PREDATOR and PREY

1. Let the children tell what happened in their terrariums.

2. Tell the children:

   "Any animal that catches and eats another animal is called a PREDATOR."

   Write the word PREDATOR on the chalkboard.

   "Any animal that a PREDATOR eats is called the PREY."

   Write the word PREY on the chalkboard.

   Have the class say PREDATOR and PREY several times.

3. Ask the children:

   "Which animals in your terrariums are PREDATORS?" Which are PREY?"

   "Can you think of other examples of PREDATORS and PREY?"

4. Tell the children to look at the bulletin board. Look at the animals they drew. Ask:

   "Which of these animals are PREDATORS?"

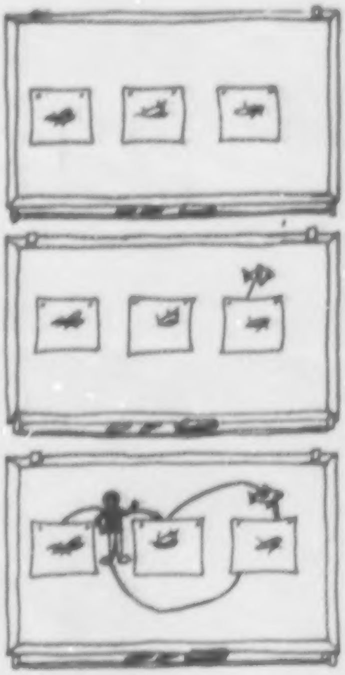
   "What is the PREY of the PREDATORS?"

   "Which of these animals are PREY?"

   "What PREDATOR eats them?"

5. Let the children connect string between PREDATOR and PREY pictures on the bulletin board. They should tell you which animal is the PREDATOR and which animal is the PREY.

Next Lesson-Talking About PREDATOR and PREY



1. Ask three people to draw a picture of an animal. The animals must be different.

   Tape the three animal pictures on the chalkboard.

   Ask the class: "Can you think of an animal that might eat one of the animals in the picture?"

   Let a volunteer draw a picture of the animal on the chalkboard (use chalk).

   Ask: "Which animal is the PREDATOR and which is the PREY?"

   Have a student connect the PREDATOR and PREY with a chalk line.

   Do this with other volunteers until the board has many pictures and lines on it. Always ask the children to tell which is the PREDATOR and which is the PREY.

2. Ask the children:

   "How can the PREY escape?"

   "Does the PREDATOR always catch the PREY?"

   "How does the PREDATOR catch the PREY? Can you give examples?"

   Let the class discuss these questions. Let them talk about animals they are familiar with. They might also talk about animals they have heard about, but have never seen.

Last Lesson-Clean-up

Let the children clean-up the terrariums. You supervise, but let them do it. The organisms can be put in the school playground. Some children may want to take ant lions home. Store the terrariums after they are washed and dried.

OPTIONAL ACTIVITY - FILMS

You might show the class a 16 mm film showing PREDATOR and PREY. After showing a film, discuss the PREDATORS and PREY that were in the film.

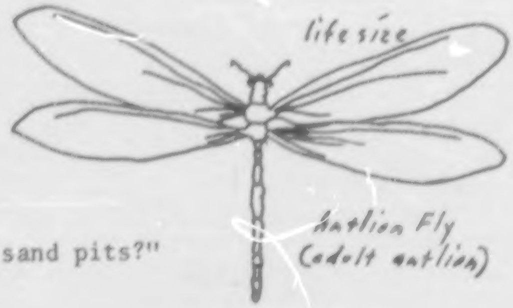
OPTIONAL ACTIVITY - WALK AROUND THE SCHOOL

You might take the class on a walk to find examples of PREDATORS and PREY. For example: lizards, spiders, crabs and other animals are easily observed.

OPTIONAL ACTIVITY - "ASK THE ANT LION"

If the children become interested in the ant lions, there are many activities they could do. The important thing is to let the children discuss their observations and form their own questions. The teacher can listen and encourage the class to discuss the questions and to do experiments to answer the questions.

Here are some questions children have asked before. Maybe your class will ask some of the same questions.



"How does it move?"

"What does it eat?"

"Why does it live in those little sand pits?"

"How does it make those pits?"

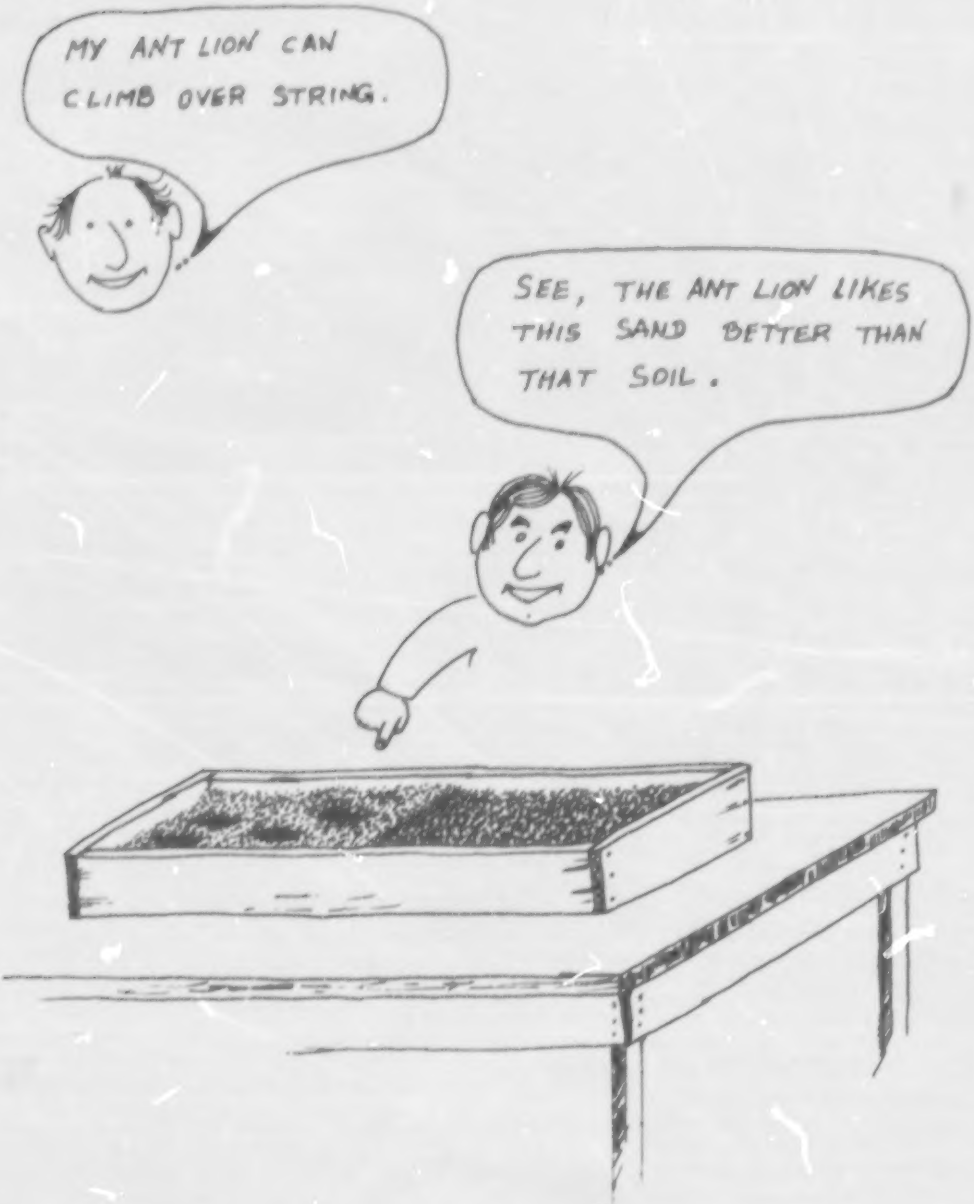
"Can it make pits in gravel? In flour? In ashes?"

"How big a thing can it throw out of its pit?"

"Can it see where it goes?"

This activity could be a very interesting study in animal behavior. It could take several weeks if the class becomes very interested.

The teachers guide for "Ask The Ant Lion" from the A. P. S. P. (African Primary Science Program) has more information about ant lions.


MY ANT LION CAN CLIMB OVER STRING.
SEE, THE ANT LION LIKES THIS SAND BETTER THAN THAT SOIL.

ACTIVITY 10B PREDATOR-PREY RELATIONSHIP (OTHER EXAMPLES)

YOU CAN USE THE EXAMPLES IN THIS ACTIVITY IN PLACE OF ACTIVITIES 10 AND 10A OR YOU CAN USE THE EXAMPLES IN THIS ACTIVITY AS AN OPTIONAL ACTIVITY AFTER YOU DO ACTIVITY 10 OR 10A.

SYNOPSIS (WHAT YOU WILL BE DOING)

Same as Activity 10 and 10A, but using different animals.

OVERVIEW OF THIS ACTIVITY (WHY YOU ARE DOING THIS)

Same as Activity 10 and 10A.

TEACHING SUGGESTIONS

First and Second Day-The Children See One Animal Eat Another Animal

Pick the example below that you wish to use. Use one or two science lessons to catch the animals and to let the children see the PREDATOR eat the PREY. You may use examples which are not listed below. These examples are only suggestions.

LOOK; IT'S EATING THE OTHER ANIMAL

Example #1 Put mosquito larva into a freshwater aquarium containing mosquito fish.

Example #2 Put small sea cucumbers into a salt-water aquarium containing crabs.

Example #3 Take the class out to a spider web. Let them put a small insect into the web with the spider.

Example #4 Put small live insects into a terrarium containing a toad.

Example #5 Put brine shrimp into a saltwater aquarium containing fish.

Example #6 Put small insects into a terrarium containing a praying mantis.

Example #7 Put small saltwater fish in a saltwater aquarium with larger saltwater fish.

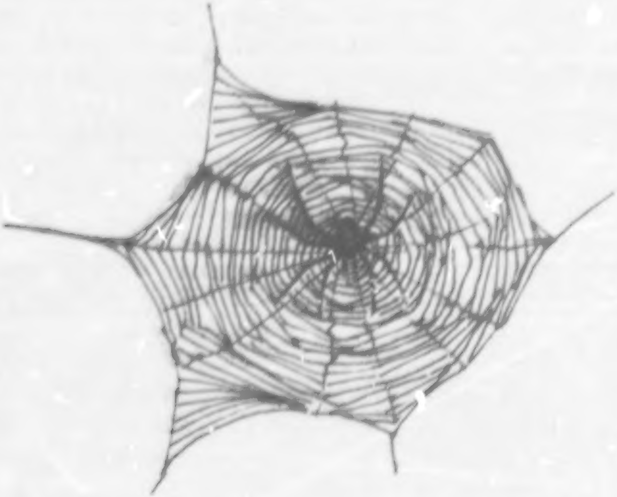
Look at Activity 10, Pages 74 and 75 for ideas on how to teach the lessons for the First Day and Second Day.

Third Day-Inventing the Terms PREDATOR and PREY

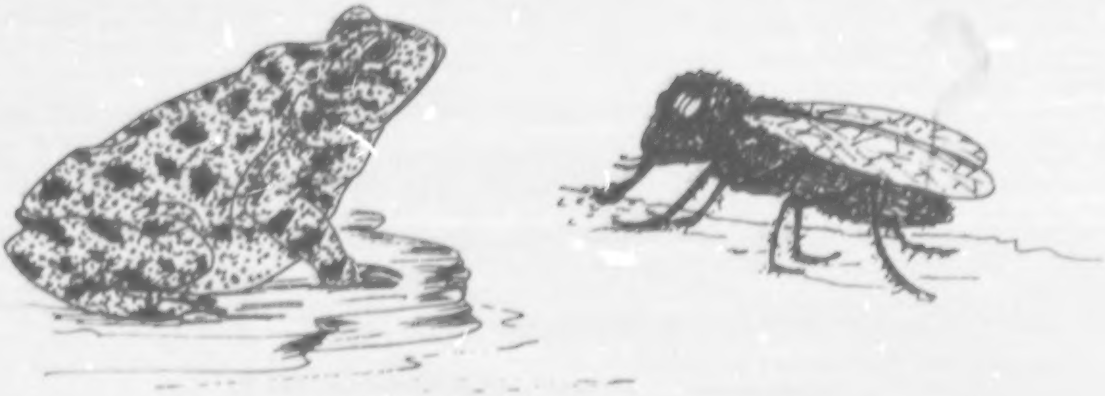
Turn to Activity 10, page 76. Do what it says for the Later Lesson.

Next Lesson-Talking About PREDATOR and PREY

Turn to Activity 10, page 77. Do what it says for the Next Lesson.



WHAT EATS WHAT?



ACTIVITY 11 FOOD WE EAT

SYNOPSIS (WHAT YOU WILL BE DOING)

The children draw some pictures of familiar foods. They talk about where each food comes from. You put the drawing and the name of the food in the correct column on the chalkboard. One column is for food that comes from a PLANT. One column is for food that comes from an ANIMAL. You then give the children some pictures of foods to cut out. You ask the children to decide if each picture should go under the PLANT column or the ANIMAL column.

OVERVIEW OF THIS ACTIVITY (WHY YOU ARE DOING THIS)

This activity helps the children discover that all their food comes from either an ANIMAL or a PLANT. This will be easy for the food from their own island. They may not know about the food brought to the island and sold in the stores.

This activity prepares the children for Activity 12 (Food Chains). It helps them see that they are a part of many food chains.

MATERIALS

For each child:
    pair of scissors
    sheet of paper
    set of "Foods We Eat" student worksheets
    crayons

For the class:
    masking tape

TEACHING SUGGESTIONS

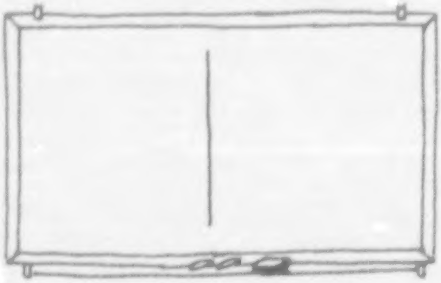
First Day-Drawing Some Foods We Eat

1. Tell the children to draw a picture of a kind of food they eat. Give each child a piece of paper. Let them make their drawings before doing the next part.

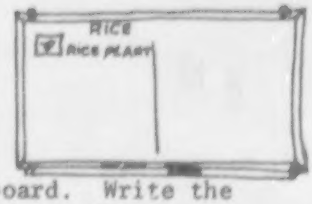
2. Divide the chalkboard into two columns (parts). Do not label the columns yet.

3. Ask the following:

   "Would one volunteer tell the class the food he has in his picture?"



"Where did this food come from?" For example, a banana comes from a banana tree."

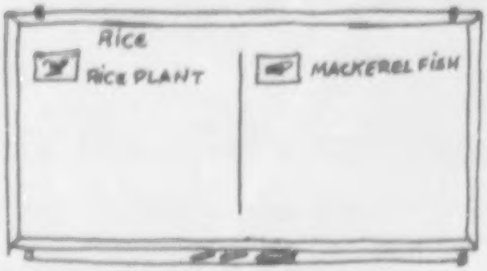

RICE
RICE PLANT

Take the volunteers picture and tape it on the board. Write the name of the food and where it came from beside the picture.

4. Ask the following:

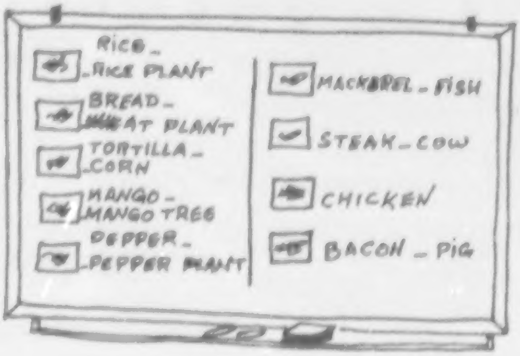
   "Would another volunteer tell the class the food he has in his picture?"

   "Where did this food come from?"


RICE
RICE PLANT
MACKEREL FISH

   Take the volunteers picture and tape it on the board. Be sure you put all foods that come from PLANTS in one column and all foods that come from ANIMALS in the other column. Write the name of the food and where it came from beside the picture.

5. Ask other children to tell the class the food in their picture. Discuss where each food comes from. Put the pictures on the board. Write the name of the food and where it comes from beside each picture.


RICE – RICE PLANT
BREAD – WHEAT PLANT
TORTILLA – CORN
MANGO – MANGO TREE
PEPPER – PEPPER PLANT
MACKEREL – FISH
STEAK – COW
CHICKEN
BACON – PIG

   Be sure you are putting all the foods that come from PLANTS in one column and all the foods that come from ANIMALS in the other column.

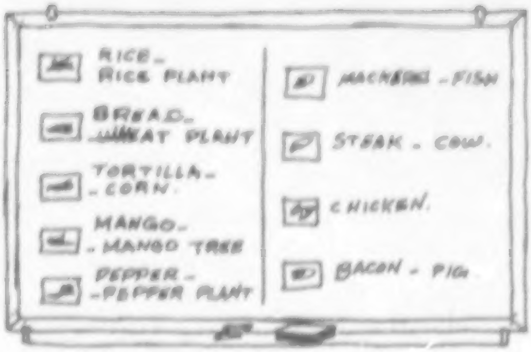
   Stop when the board is full and most of the children's pictures are on the board. Several children may have drawn the same food picture. Only use one picture of each kind of food. For example: if seven children drew a picture of rice, only use one of the pictures.

6. Ask the class to look at the two lists (columns).

"What is the same about where these foods came from?"

"Write the word PLANT over the list of foods that came from PLANTS.

"Write the word ANIMAL over the list of foods that came from ANIMALS."


RICE - RICE PLANT
BREAD - WHEAT PLANT
TORTILLA - CORN.
MANGO - MANGO TREE
PEPPER - PEPPER PLANT
MACKEREL - FISH
STEAK - COW.
CHICKEN.
BACON - PIG.

Second Day-Sorting Pictures of Food

1. Give each student a pair of scissors and a set of "Foods We Eat" worksheets.

2. Ask the children to cut the pictures apart and sort them into two piles. One pile should be foods that come from PLANTS. The other pile should be foods that come from ANIMALS.

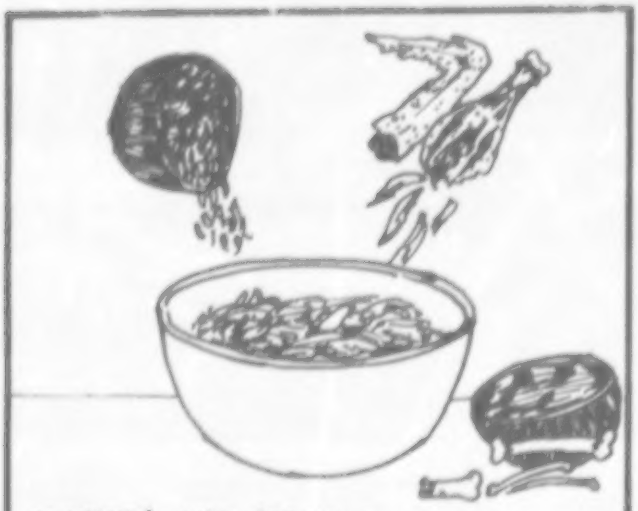
3. Have a class discussion after the sorting is finished:

   "Which foods are in the ANIMAL pile?"

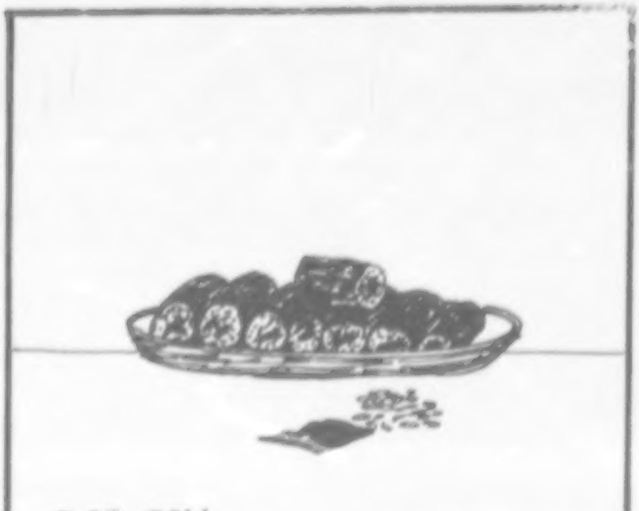
   "Which foods are in the PLANT pile?"

   "Can you think of any foods we have not talked about? Where does it come from: PLANT or ANIMAL?"

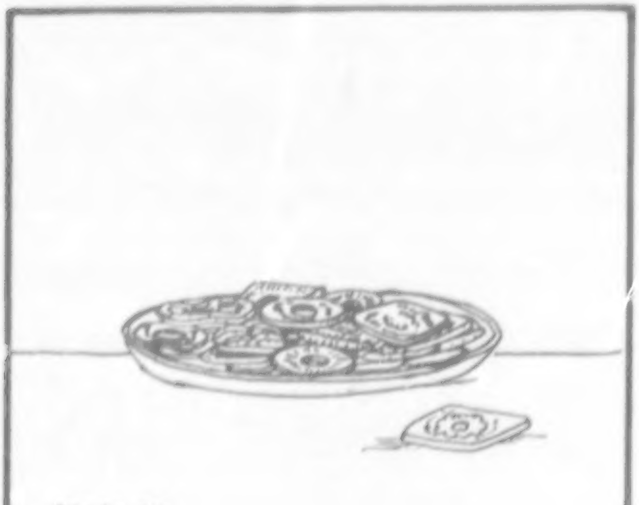
4. At the end of the lesson, have each child hand in his pile of pictures. These could be used next year.



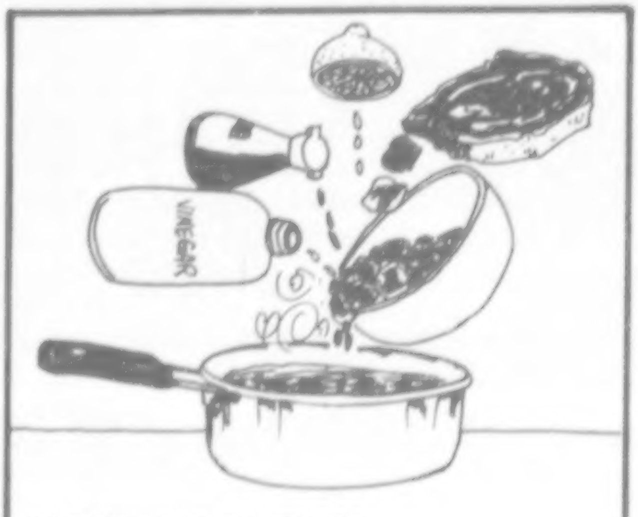
CHICKEN AND COCONUT



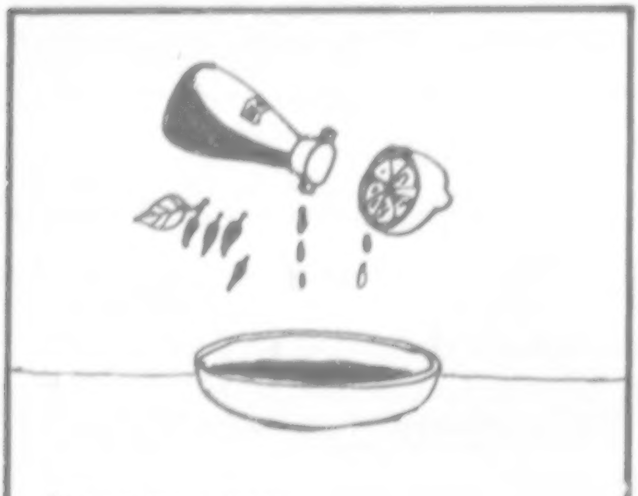
RICE ROLL



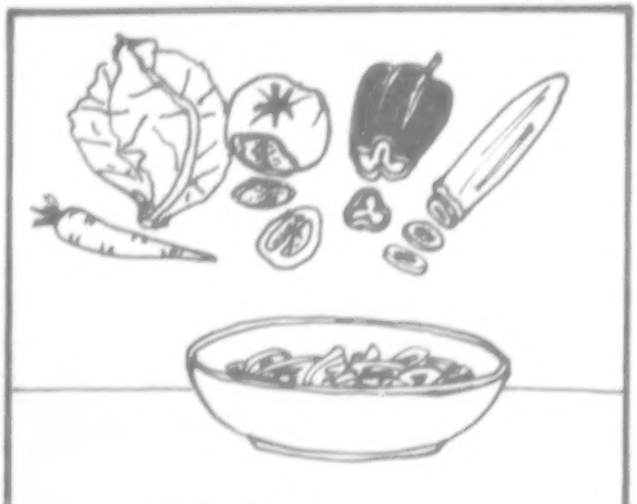
COOKIES



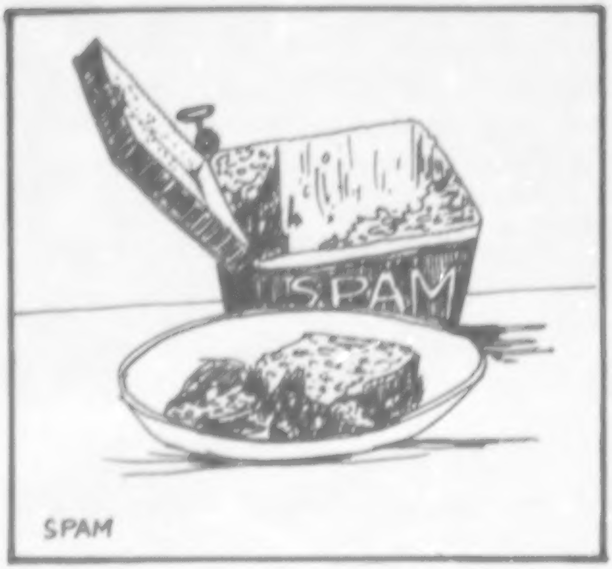
MARINATED PORK PIECES



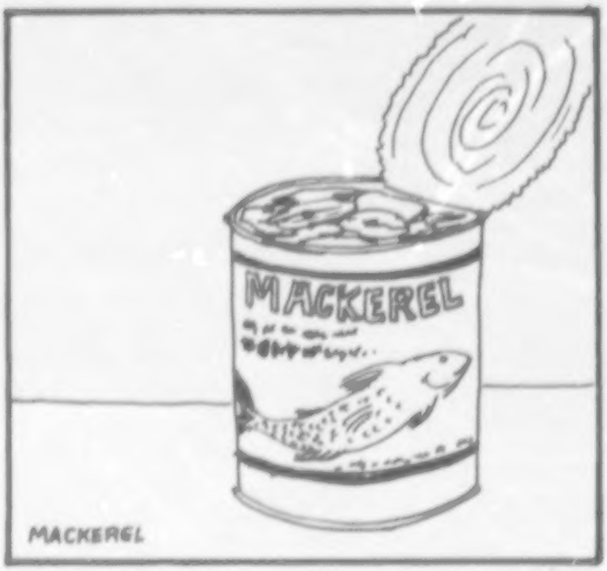
HOT SOY SAUCE



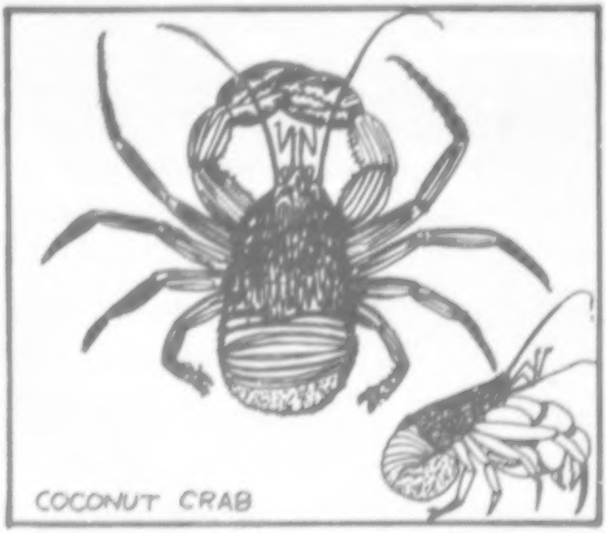
MIXED VEGETABLES



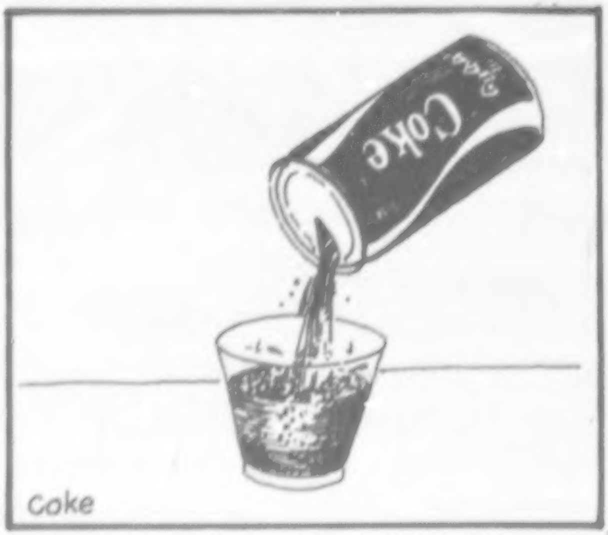
SPAM



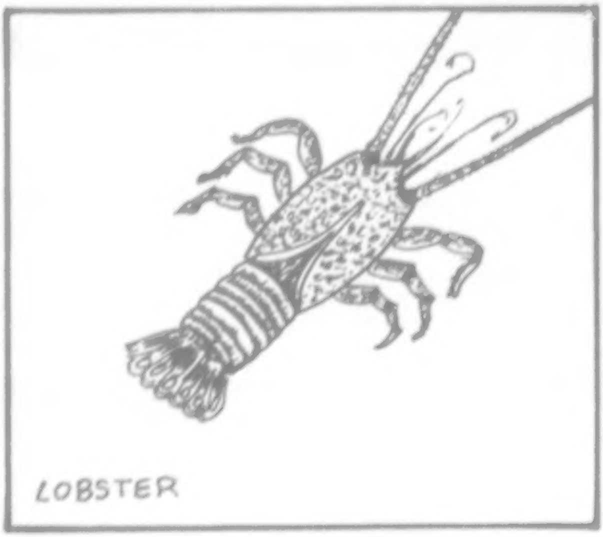
MACKEREL



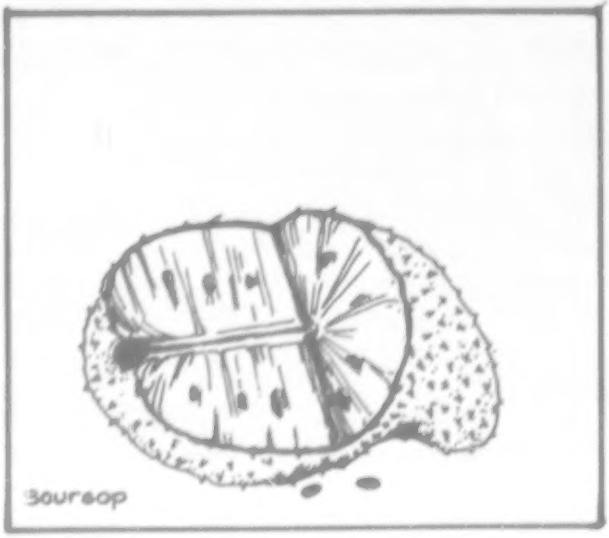
COCONUT CRAB



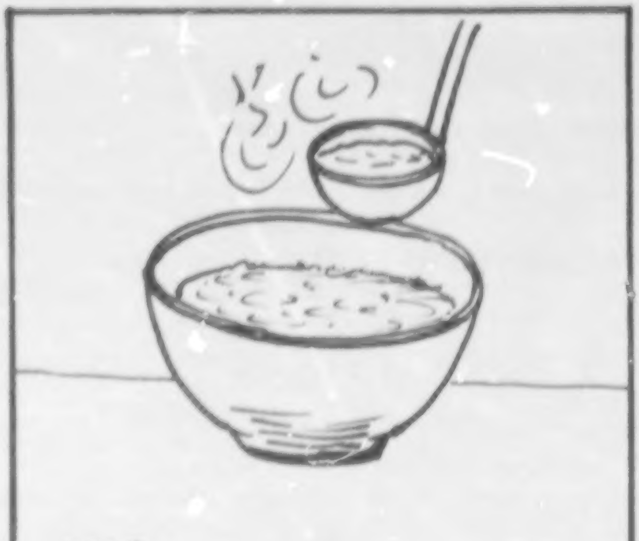
Coke



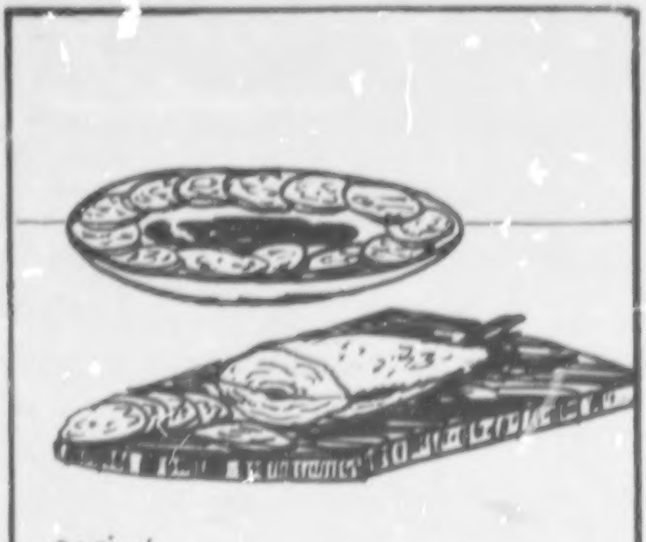
LOBSTER



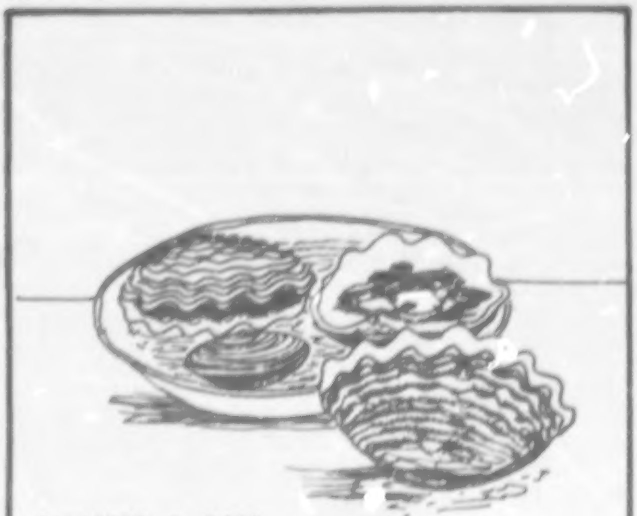
Soursop



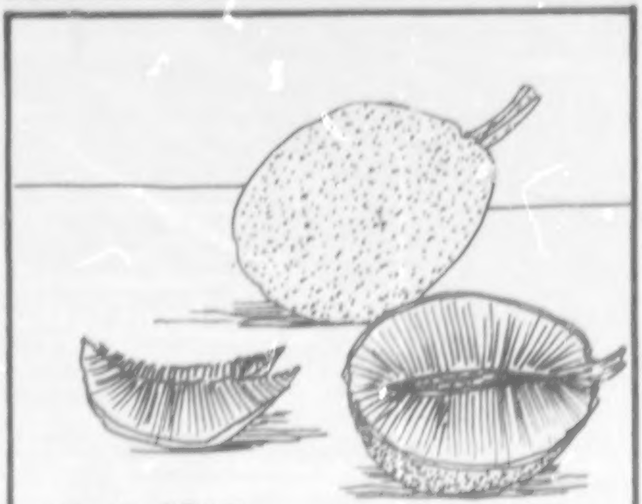
SOUP



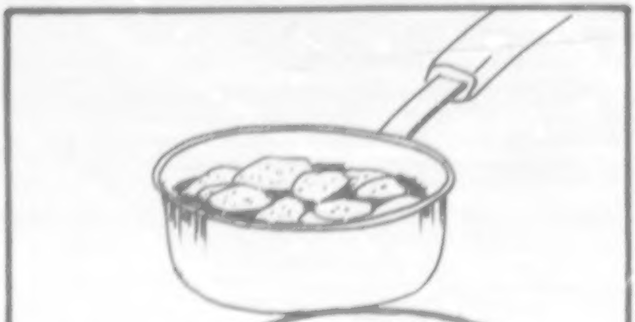
SASIMI



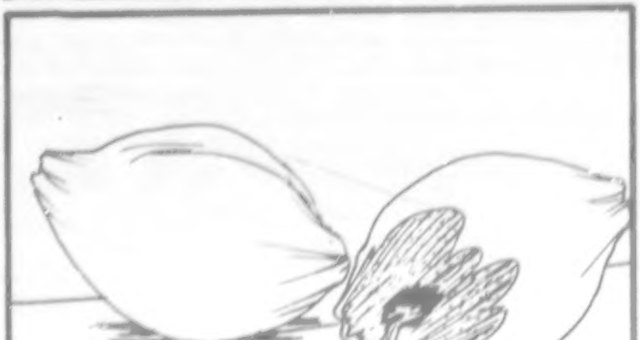
COOKED CLAMS



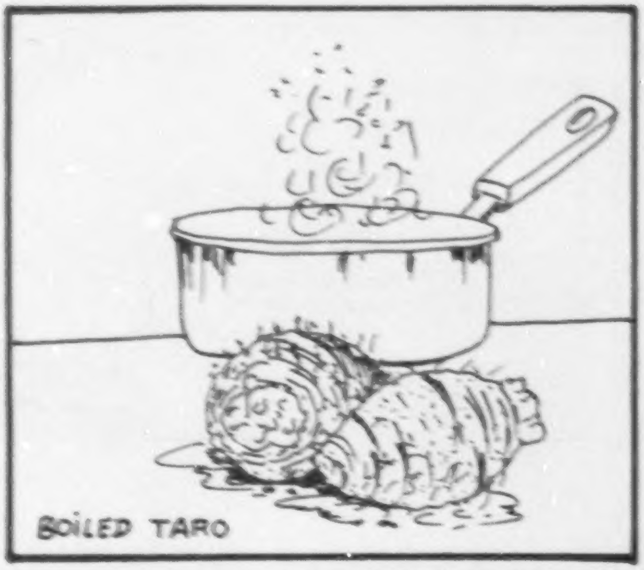
BREAD FRUIT



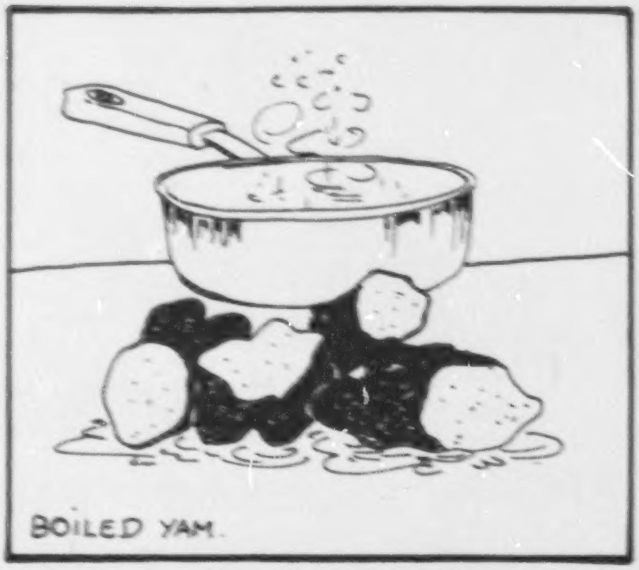
BOILED SWEET POTATOES



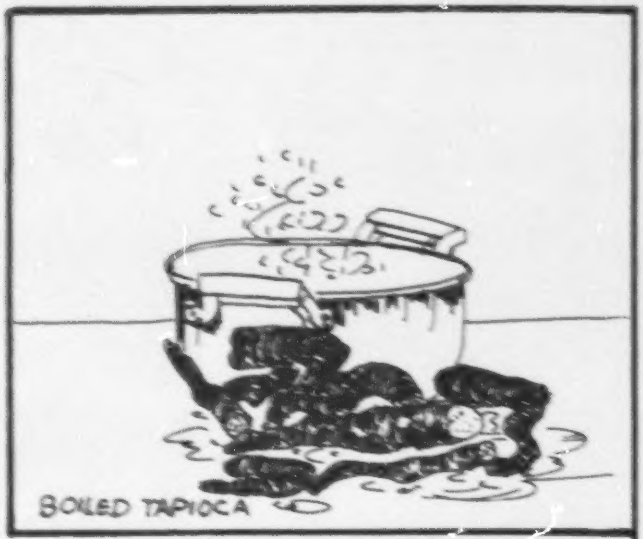
DRINKING COCONUT



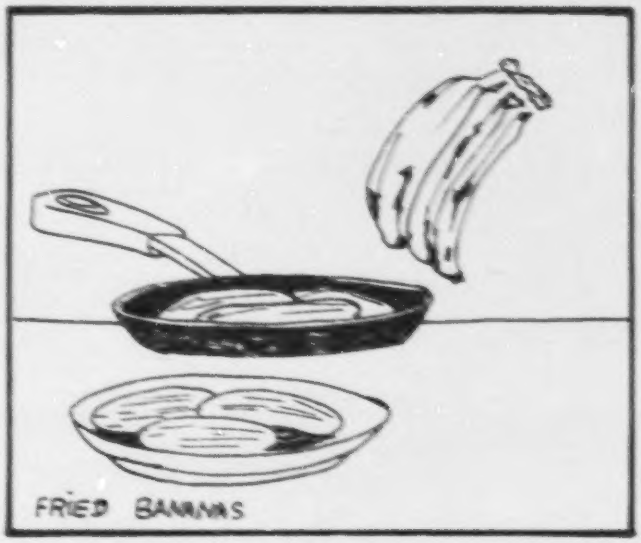
BOILED TARO



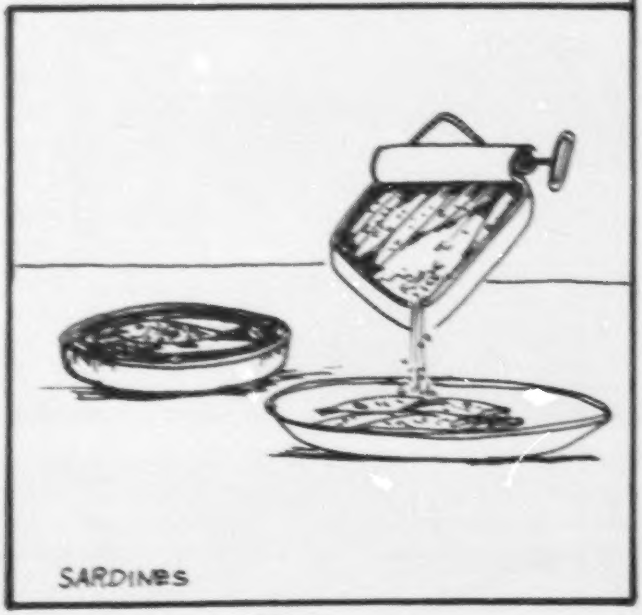
BOILED YAM.



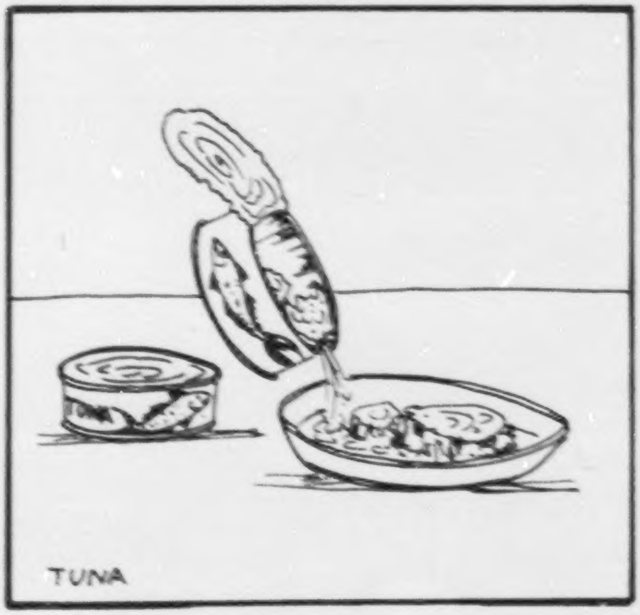
BOILED TAPIOCA



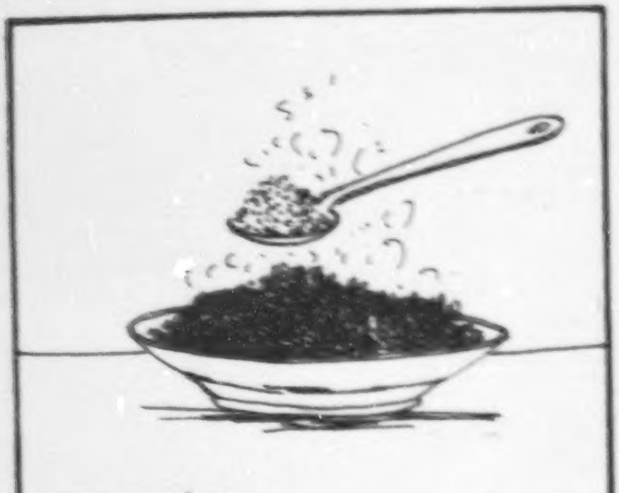
FRIED BANANAS



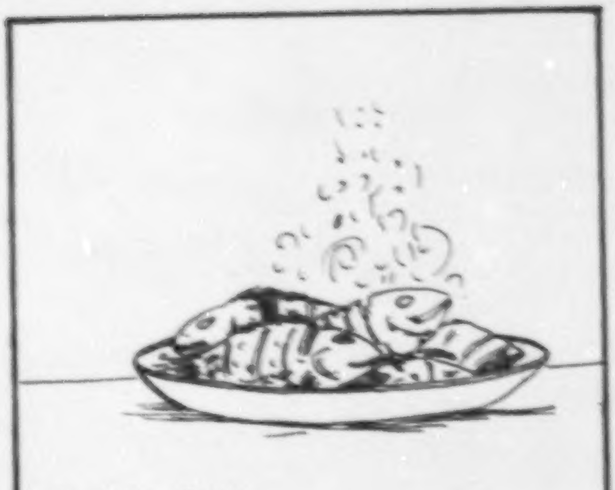
SARDINES



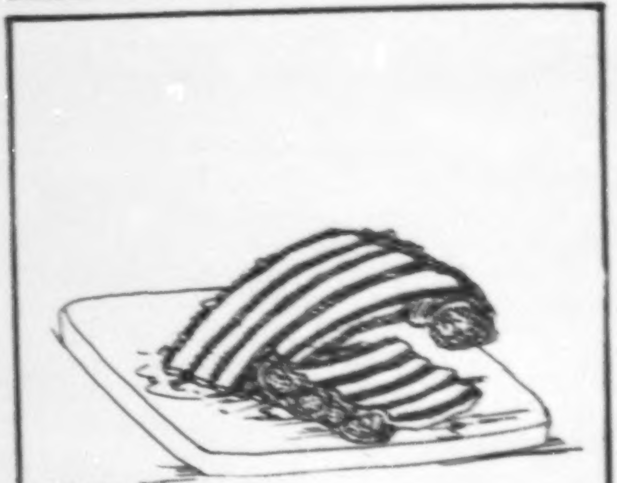
TUNA



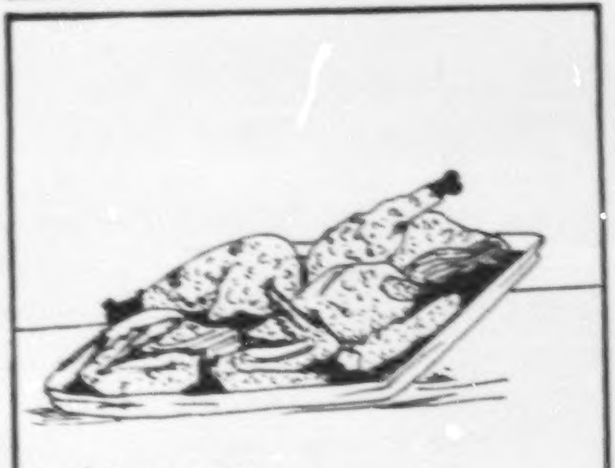
COOKED RICE



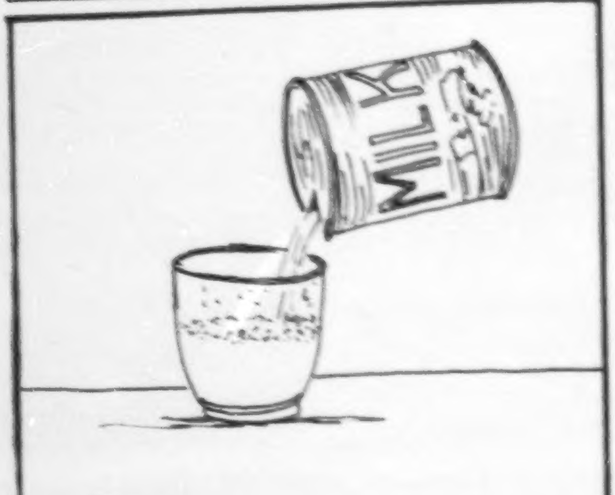
COOKED FISH



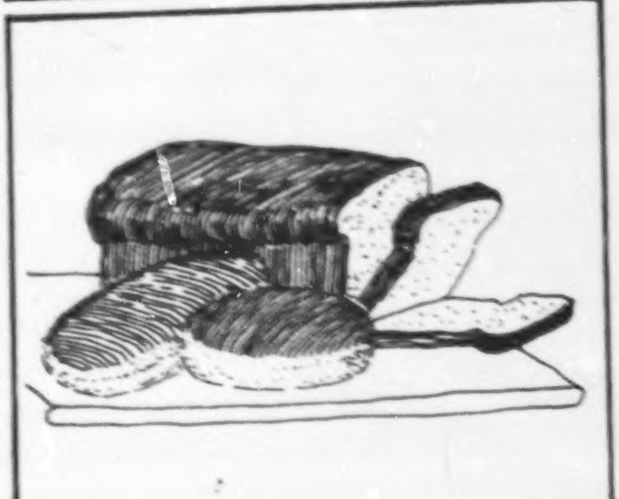
SPARE RIBS



FRIED CHICKEN



MILK



BREAD

ACTIVITY 11A OUR FOOD - WHERE DOES IT COME FROM? WHO HELPS US GET IT?

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children go on two field trips, one to a store and one to a farm. They find what kinds of food they get from each of these places. They talk to the people who work in these places and find out about their jobs. Back in the classroom the children discuss what they have experienced and observed.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity takes the children out of the classroom and lets them see where the food they eat comes from. They will also find out how other people help them get the food they eat and what kind of work these people do.

PREPARATION

Contact the store and farm owner at least one week in advance and ask for permission to visit. Explain to them why your class is taking the field trip. Ask them to be present on the day of the field trip to guide the children and answer their questions.

If there isn't a store or farm within walking distance you will have to arrange for transportation at least one week in advance.

Make sure you know, how you want the children to behave while they are on the field trip. Read the Teacher Aid, "How to Take a Field Trip".

TEACHING SUGGESTIONS

First Day-Planning The Field Trip

1. Talk to the children about the food they eat. Ask:

   "Where does the food you eat come from?"

   Accept all answers; hopefully one student will say that he or she gets some from the store. Ask:

   "What kind of food do you get from the store?"

   Let each child name at least one kind of food. Then ask:

   "Who helps you when you go to the store?"

   "What kind of work do you think the storekeeper does?"

2. Tell the class they will be taking a field trip tomorrow to find out about the storekeeper's job. Help them make a list of questions they can ask the storekeeper.

   Possible questions:

   > "Where does the storekeeper get the food she sells?"
   >
   > "How does the storekeeper know what kind of food to sell?"
   >
   > "What does the storekeeper do with the money she gets?"
   >
   > "How many hours a day does she work?"
   >
   > "Who cleans the store?"
   >
   > "How old do you have to be to work in a store?"

3. Discuss the field trip rules. Only children who behave will be allowed to take the field trip. If they are bad they will be sent back to the classroom.

4. Remind the storeowner that the class will be coming tomorrow.

Second Day-Taking The Field Trip To The Store

1. Take the children to the store. Introduce them to the storekeeper. Let her show the class around the store.

2. Let the children look at the shelves. Can they find the foods they eat at home?

3. Let the children talk to the storekeeper. They can find out about her job and how she helps them get the food they eat. If the children don't remember all of the questions help them by asking some yourself.

   > "Where does the storekeeper get the food she sells?"
   >
   > "How does the storekeeper know what kind of food to sell?"
   >
   > "What does the storekeeper do with the money she gets?"
   >
   > "How many hours a day does she work?"
   >
   > "Who cleans the store?"
   >
   > "How old do you have to be to work in a store?"

Third Day-Discussing The Field Trip

1. Let the students pretend they are storekeepers. Ask them:

   "How would you set up a store in this classroom?"

   "What kind of work would you have to do?"

Fourth Day-Planning The Field Trip To The Farm

1. Ask the class:

   "Where else do you get food besides the store?"

   Accept all answers; hopefully one student will say that he or she gets some food from the farm. Ask:

   "What kind of food do you get from the farm?"

   Let each child name at least one kind of food. Then ask:

   "Who works at the farm?"

   "What kind of work does the farmer do?"

2. Tell the class they will be taking a field trip tomorrow to find out about the kind of work a farmer does. Help them make a list of questions they can ask the farmer.

   Possible questions:

   "Where does the farmer get this seeds?"

   "How does he decide what to plant?"

   "Does he sell the plants he grows?" "Where?"

   "Does he have any animals?"

   "Does anyone help him work?"

   "How old do you have to be to work on a farm?"

   "How many hours a day does the farmer work?

3. Remind the class of the field trip rules.

4. Remind the farmer that the class will be coming tomorrow.

Fifth Day-Taking The Field Trip To The Farm

1. Take the children to the farm. Introduce them to the farmer and let the farmer show them around.

2. Let the children look at the plants and animals. Can they find foods they have eaten at home?

3. Let the children talk to the farmer. They can find out about the work he does and how he helps them get the food they eat. If the children don't remember all of the questions help them by asking some yourself.

   Possible questions:

   "Where does he get his seeds?"

   "How does he decide what to plant?"

   "Does he have any animals?"

   "Does he sell his plants and animals?" "Where?"

   "Does anyone help him work?"

   "How old do you have to be to work on a farm?"

   "How many hours a day does the farmer work?"

Sixth Day-Discussing The Field Trip To The Farm

1. Let the children pretend they are farmers. Ask them:

   "How would you set up a farm?"

   "What kind of work would you do?"

   "What things would you need?"

OPTIONAL FIELD TRIPS

The children may bring up other places where they get food. They might say: the ocean where we get fish, the boonies where we get crab or home gardens where we get taro.

You might want to take field trips to these areas.

OPTIONAL ACTIVITIES IN THE CLASSROOM

You may want to let the class make graphs about the foods they get from the store or farm, to find out which foods they eat most often. For more information about graphs turn back to pages 8 and 9.

ACTIVITY 12 FOOD CHAINS

SYNOPSIS (WHAT YOU WILL BE DOING)

The children talk about the "animal eaters" and "plant eaters" they have seen. The concept of FOOD CHAIN is then invented for the class. Several FOOD CHAINS are made. The children should see that all the FOOD CHAINS start with a plant.

OVERVIEW OF THIS ACTIVITY (WHY YOU ARE DOING THIS)

In this activity the children look at relationships between plants, plant eaters and animal eaters. The FOOD CHAINS show that populations in a certain place are related to each other by what each population eats.

The FOOD CHAINS show that all food can be traced back to plants.

This activity prepares the class for understanding Activity 13 FOOD WEBS.

MATERIALS

For each child:
    "Lagoon-beach" picture from Activity 9 - page 42
    sheet of paper

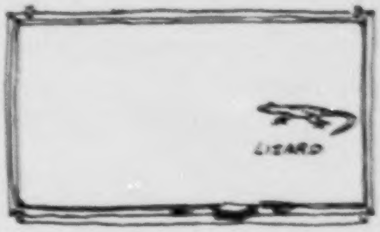
TEACHING SUGGESTIONS

First Day-Inventing the FOOD CHAIN Concept

1. Ask the class the following questions. Draw and label the children's answers on the chalkboard.

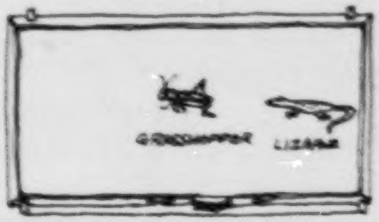
   "What animal eater did you see sometime this year?"

   Draw a picture of the animal named on the chalkboard. Put its name under it.



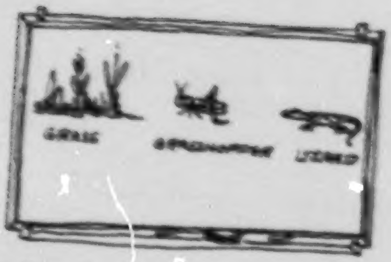
   "What did that animal eat?"

   Draw the picture of the animal to the left of the first animal. Put its name under it.

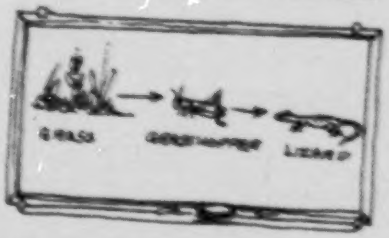


"What did that animal eat?"

Draw a picture of the plant to the left of the last animal named. Put its name under it. (If the class has named an animal and not a plant, put it on the board. Then ask "What did it eat? Stop asking "What did it eat when the children name a plant.)



2. Put an arrow (⟶) from the plant to the animal that ate the plant. Put arrows from that animal to the animal that ate it. Put in arrow until all the organisms are connected.



Tell the class that this word/picture sentence is called a FOOD CHAIN.

Write the words FOOD CHAIN on the board.

Tell the class the arrow means "is eaten by".

Let the class read the FOOD CHAIN. For example:

"The grass is eaten by the grasshopper. The grasshopper is eaten by the lizard."

3. Ask the children if they can think of another FOOD CHAIN.

Put the pictures and names of the organisms on the chalkboard as the children name them. Put the arrows between the organisms.

Ask the children to read the FOOD CHAIN.

Be sure the FOOD CHAIN has a plant in it. If it does not have a plant, ask what the animal eats until they find the animal that eats a plant.

4. Give each child a sheet of paper. Ask them to each make a FOOD CHAIN using pictures or words.

5. Ask volunteers to put their FOOD CHAINS on the chalkboard. Be sure each FOOD CHAIN starts on the left with a plant.

Second Day-Building FOOD CHAINS

1. Give each child a "lagoon-beach" picture. (The same picture from Activity 9-page 42.)

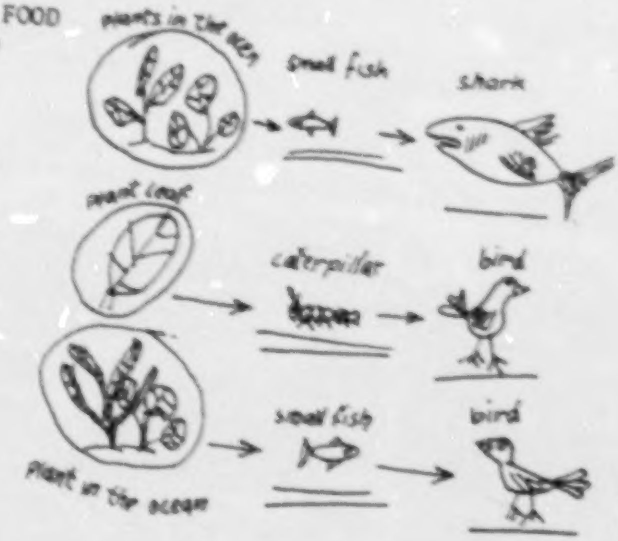
2. Ask volunteers to tell you FOOD CHAINS they can find in the picture.

   Put each FOOD CHAIN on the chalkboard until you have five FOOD CHAINS on the chalkboard. Each FOOD CHAIN should start with a plant.

   Ask a volunteer to put one line under each animal eater.

   Ask a volunteer to put two lines under each plant eater.

   Ask a volunteer to circle each plant.


plants in the ocean
small fish
shark
plant leaf
caterpillar
bird
small fish
bird
Plant in the ocean

3. Ask the class what all the FOOD CHAINS have that is the same. They should be able to see that:

   Each FOOD CHAIN starts with a plant.

   Each FOOD CHAIN has a plant eater.

   Most FOOD CHAINS have an animal eater.

ACTIVITY 13 FOOD WEBS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children put together several food chains to make a FOOD WEB. They talk about food relationships among several populations of organisms living in one place.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

The FOOD WEB concept is important because it shows that the relationships between organisms are many and complex.

What happens to one organism causes a change for another organism. On small islands, such as in Micronesia, many bad things can happen because people do not understand relationships between organisms. The spiny starfish destroying the reef is such a problem.

The FOOD WEB concept is invented here and will be used in most of the upper grade "Life Science" units. This activity invents the concept. The upper grade units use and build on the concept.

MATERIALS

For each child:
    sheet of paper
    "lagoon-beach" picture from Activities 9 and 12

For the class:
    string

TEACHING SUGGESTIONS

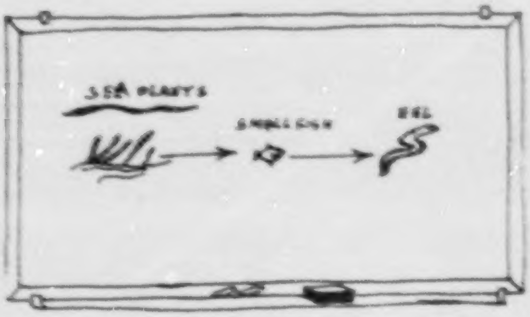
First Day-Building And Inventing A FOOD WEB

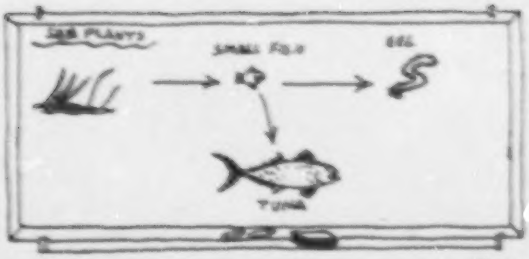
1. Give each child a "Lagoon-beach" picture from Activities 9 and 12.

   Ask a volunteer to tell the class about one food chain he can find in the picture.

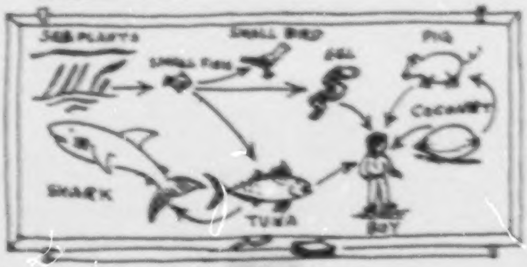
   Put the food chain on the chalkboard. Draw pictures of the organisms. Put the organisms names under the pictures. Put arrows to show "is eaten by".

   Ask: "What other organisms eat the organisms on the board?"





Add the new organism's picture and name to the food chain. Put the arrows in. AN ORGANISM SHOULD BE ON THE BOARD ONLY ONCE. IT MAY HAVE MANY ARROWS TO AND FROM IT.



Ask the class for more organisms that eat the organisms on the board. Keep adding new organisms and arrows until the board is full or the students have no more ideas.

2. Tell the children:

> "What we have on the board is called a FOOD WEB."

Write the word FOOD WEB on the board.

Explain to the class why it is called a FOOD WEB. → FOOD because it shows what-eats-what.
→ WEB because the arrows, pictures and and names look like a web.

3. Ask the children to look at the bulletin board from Activity 9 "Plant Eaters and Animal Eaters". Ask:

> "Could we put strings from one organism to another to make a FOOD WEB?"

Tell the class they should only talk about organisms that really eat other organisms. If it really eats that organism the connection is O.K. For example: A shark might eat a tuna fish but would not eat tangan tangan.

Let volunteers point out "what-eats-what". Give them a piece of string. Let them connect the organisms. Do this until the children do not see any more connections. The bulletin board should be a "web" of string.

Second Day-Each Child Makes A FOOD WEB

1. Tell the class that each student can make his own FOOD WEB.

Explain the two things to remember:

> "Use organisms that really eat other organisms." For example - a shark would not eat a pig. A shark might eat a tuna. A man might eat a pig. In real life sharks don't eat pigs.

"The organisms in the FOOD WEB should live in the same area." For example - a cat might eat a bird on Saipan. A fox would not eat a bird on Saipan because there are no foxes on Saipan. A fox might eat a bird in the United States because there are foxes there.

2. Give each child a sheet of paper. Let them draw a FOOD WEB.

   You might let them pick the place (area) they wish to draw the FOOD WEB of. For example: the lagoon, the ocean, the land on Saipan.

3. Pick some of the suggestions below to finish the activity:

Suggestion #1	Discuss the FOOD WEBS the children draw.
Suggestion #2	Put the children's FOOD WEBS on the bulletin board.
Suggestion #3	Let the children explain their FOOD WEBS to other children in small groups.
Suggestion #4	Let the children look at pictures in magazines and library books. Can any of these organisms be added to their FOOD WEBS?

OPTIONAL ACTIVITY-EACH CHILD IS AN ORGANISM

The class or the teacher make pictures of organisms found on the island or in the ocean around the island. Each child gets one picture. Pin the picture on the child's shirt or blouse. Start with one organism and ask, "What does it eat?" or "What eats this organism?" Connect string between the two organisms. Let those two children hold the string. For example - a string might go from the child with the tuna picture to the child with the small fish picture.

Keep asking, "What does it eat?" or "What eats this organism?" until most of the children are holding one or more strings.

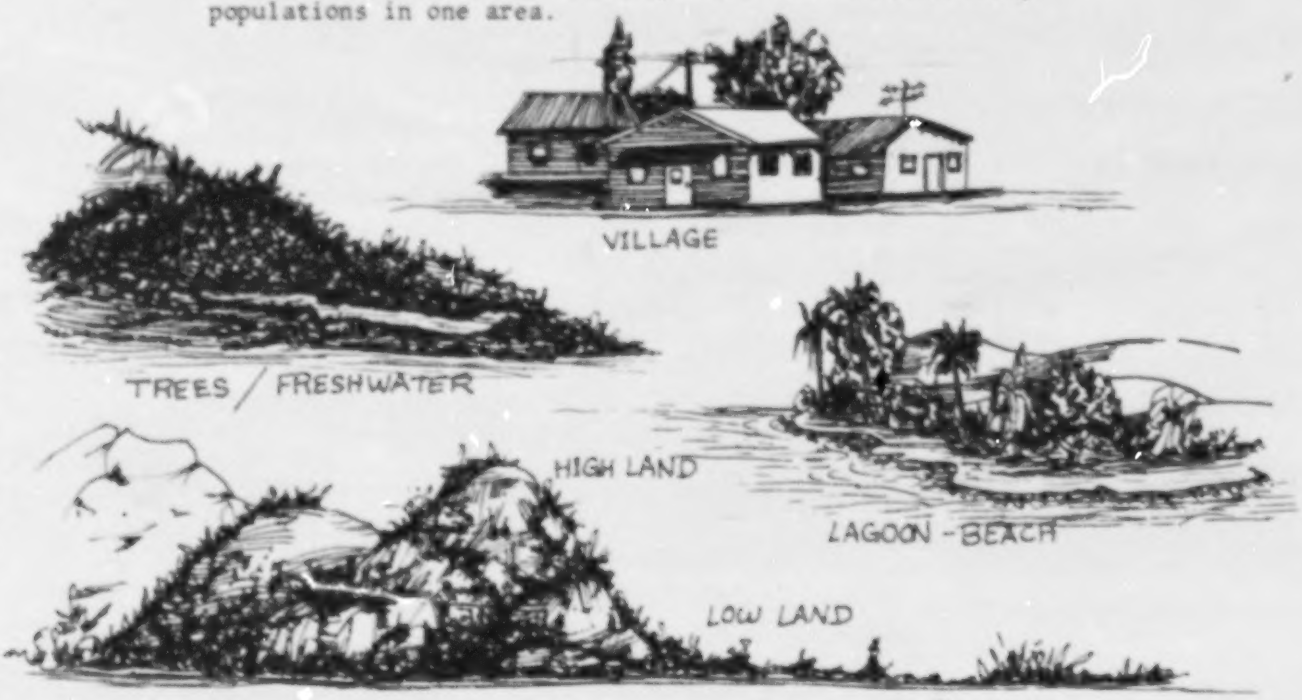
This allows the children to see how a WEB is made and how many organisms are connected in a FOOD relationship.

PART 4
the Community

OBJECTIVES (WHERE PART FOUR IS GOING)

At the end of Part Four the children should be able to:

- Use the word COMMUNITY when they talk about all the populations that live in one particular area.
- Talk about the food relationships that can be found among populations in one area.


VILLAGE
TREES / FRESHWATER
HIGH LAND
LAGOON - BEACH
LOW LAND

HOW ARE COMMUNITIES DIFFERENT ?

ACTIVITY 14 EXPLORING COMMUNITIES

SYNOPSIS (WHAT WILL YOU BE DOING?)

The class talks about the community they live in. The term COMMUNITY is invented for the class. A COMMUNITY is made of all the populations of different plants and animals living in the same place. A lagoon-beach COMMUNITY is discussed. The children take a field trip to observe a COMMUNITY on their island.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity allows the children to use many of the concepts they know. They now can use the concepts of populations and food webs in an actual situation. In later units the children will explore more about COMMUNITIES. This is the first introduction to the COMMUNITY concept.

PREPARATION

Look at the Teacher Aid section at the back of the book. Read "How To Take A Field Trip". You will need to make arrangements for a field trip before you start this activity. You could take a walking field trip or a bus field trip. You pick the place after reading this activity.

TEACHING SUGGESTIONS

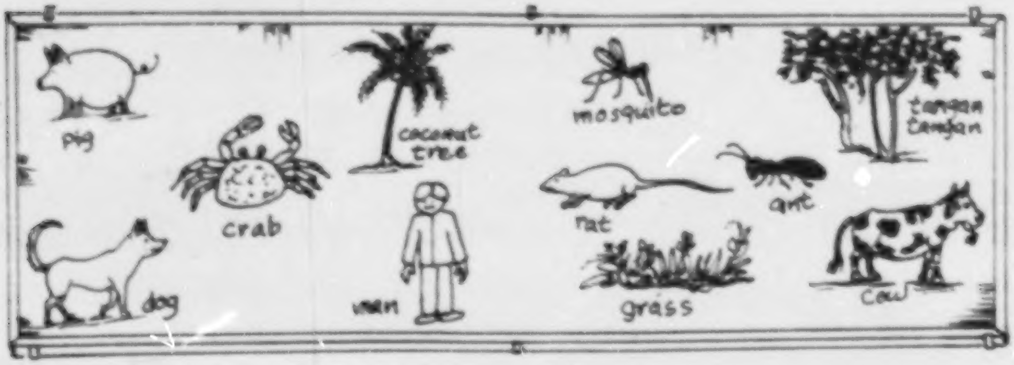
First Day-Talking About Your Community (Where You Live)

1. Have a class discussion. Draw on the chalkboard the things the children say are in their community.

   "What are the parts of your community (where you live)?"

   "What plants are in your community?"

   "What animals are in your community?"



2. Take a piece of chalk and circle all the plants and animals on the board.

Say:

"Which animals eat plants on the board?"

"What predator-prey relationships can you find?"

Connect the plants and animals with arrows. Now you have a food web.

3. Tell the children:

"All the organisms in a food web make up a COMMUNITY."

"A COMMUNITY is made of all the populations of different plants and animals living in the same place."

"On the chalkboard are the organisms in your COMMUNITY."

Second Day-Other Communities

1. Say:

"Today we are going to think about another COMMUNITY. What organisms are in the lagoon-beach COMMUNITY"?

Draw on the chalkboard the organisms the children say are in the lagoon-beach COMMUNITY.

Let volunteers connect the organisms with arrows to make a food web.

Discuss:

"Which organisms does man eat?"

"Which population do you think will be the largest?"

"Which animals live in the water?"

"Which animals live on land?"

2. Tell the class that tomorrow they will take a field trip. They will observe a COMMUNITY.

Say:

"The purpose of the field trip is to observe what organisms are in the COMMUNITY."

"You should not disturb or destroy the organisms."

Explain carefully that they are not to destroy or disturb the organisms. It is very important for the children to learn this. It is an important part of conservation. Tell the children:

"Do not kill the organisms you find. Put them back after you look at them."

"On this field trip we want to observe the organisms not collect them."

"You can move a rock or wood to look under it. Always put it back like you found it."

Tell the class the exact place they are going. Tell them the boundaries of the place. They should not go outside these boundaries.

Go over the field trip rules with the children. Refer to "How To Take a Field Trip", the Teacher Aid at the back of this unit.

Third Day-The Field Trip

1. Have a short class discussion:

   "What are we looking for on the field trip?"

   "Look for the kind of plants."

   "Look for the kinds of animals."

   "How big are the populations?"

   "Look for evidence showing what eats what."

2. Go on the field trip.

Fourth Day-Field Trip Follow Up

1. Have a class discussion. Draw on the chalkboard the things the children say were in the COMMUNITY.

   "What plants did you find in the COMMUNITY?"

   "What animals did you find in the COMMUNITY?"

   "What evidence did you find to show what eats what?"

"What populations are the biggest?"

"Which organisms lived in the ground?"

"Which organisms lived on plants?"

"Which organisms live under rocks or wood?"

2. Let volunteers put arrows on the board to make the food web.

OPTIONAL ACTIVITY-COMPARING COMMUNITIES

When you take the field trip, go to two different COMMUNITIES. Then let the children compare the two COMMUNITIES after doing the Field Trip Follow Up for each COMMUNITY. For example: Look at the beach community and the wooded (trees) community. Look at a community on low land and a community on high land. Look at a school playground community and a wooded (trees) community.

OPTIONAL ACTIVITY-FILMS ABOUT DIFFERENT COMMUNITIES

You may show your class a film about a kind of COMMUNITY. The class could discuss this community. They could compare it with communities they know about.

HOW TO TAKE A FIELD TRIP

Some of the most important learning experiences are outside the classroom. A field trip experience is just as important as classroom experience. It is usually more important than classroom experience.

A field trip should be an enjoyable learning experience for the students and the teacher. The three most important things in making it a good field trip are:

THE TRIP MUST BE WELL ORGANIZED.

THE PURPOSE OF THE FIELD TRIP MUST BE UNDERSTOOD BY EVERYONE.

ALL CHILDREN MUST UNDERSTAND THEIR RESPONSIBILITIES WHILE ON THE TRIP.

Here are suggestions to help you have a good field trip:

What should you (the teacher) do BEFORE you take the field trip?

Discuss the field trip with the principal and get his permission.

Be sure you know the place you are going to. If you have never been there, go check it out before the day of the trip.

Get permission from the owners before going on private land.

Contact people who will be guiding you or helping you. It is best to have one adult (teacher or parent) to go with you on the trip.

Get parental permission forms for each child. Do this if it is the policy of your school or for your own use.

If you will be using transportation, get the transportation arranged one week before taking the trip.

If you need transportation, arrange it one week before the day of the trip. On the day before the trip check the following: is the transportation confirmed, does the driver know the time and place to come to your school.

What should the class do BEFORE the day of the field trip?

They should know the purpose of the field trip. Discuss this in class. Discuss with the class their responsibilities. This means they know what they will be doing and what the rules are.

Tell them the kinds of clothing to wear on the trip.

If you need some special materials for the trip, the class should get it ready. For example: jars for catching things, nets, record books.

What are some good field trip rules?

The children should know the boundaries they must stay in on the field trip. They should not go outside of these boundaries. For example: You should show them the part of the beach they can work on. They should not go to another place.

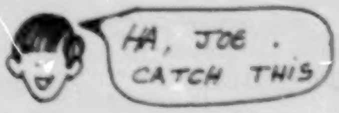
The class should leave and enter the school grounds in a quiet orderly manner.

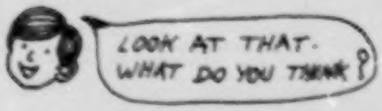
Explain things they should not do or places they should not go because it is dangerous. Examples of such SAFETY RULES are:

> "Stand in the place the teacher says inside the generator plant. No pushing or running inside the building."
>
> "Do not go into water over your head. Only go in the place the teacher says."

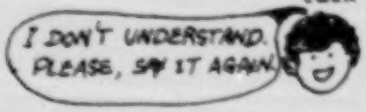
Nobody wants children to come to their place if the children are shouting, pushing, running or playing games. The children should be orderly and talk, but not shout, when they are at the place for the field trip.

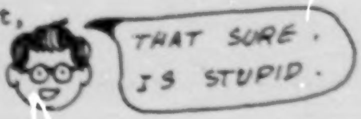
The children should:

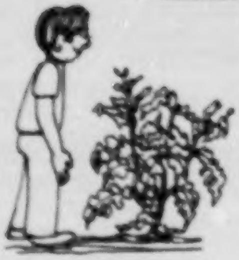



LOOK AT THAT. WHAT DO YOU THINK?

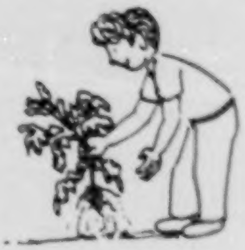
talk but do not shout,


I DON'T UNDERSTAND. PLEASE, SAY IT AGAIN.

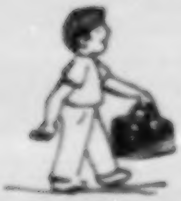

THAT SURE. IS STUPID.



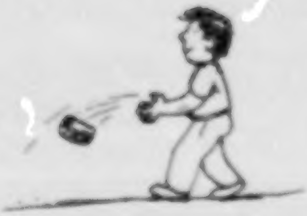
ask questions but be polite,

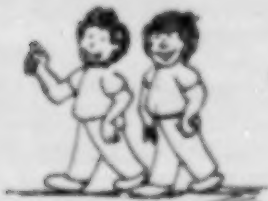


look at things but do not destroy things,

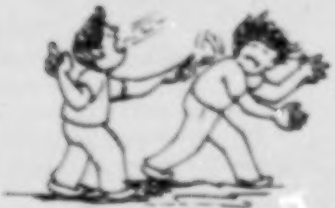


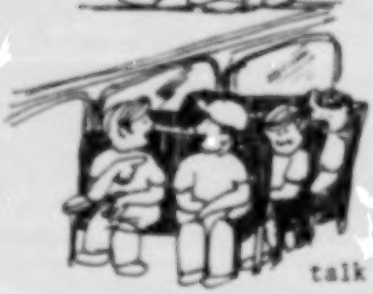
carry things but do not leave litter,





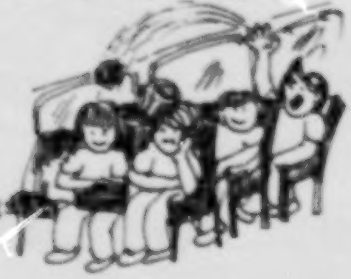
enjoy the trip but do not make it a party,





move around but do not push and run,

talk on the bus but do not run or throw things.



If things are moved they must be put back where they were found. For example if a rock is moved to look under it, it should be put back just like it was. This is good conservation. The class should leave the place like they found it. YOU (THE TEACHER) MUST SET THE EXAMPLE.

What if my children do not follow the rules?

First, be sure everyone knows the rules. Let the children tell them to you.

The rules should be made to allow the field trip to be enjoyable and instructional. Rules like, "No talking", are not good rules. ARE YOUR RULES GOOD?

When the children understand the rules, follow them. It is no good if you say, "No pushing around the large generators", but you allow children to push each other. The children will follow the rules if they know you mean it.

Warn the individual children who are not following the rules. If they do not listen, take them back to the school or the bus. Let them stay away from the trip. Be sure they are with another teacher or adult if you take them back to the bus or school.

How long should a field trip be?

Only go to the place you planned to go to. If you are going to the beach to catch organisms, do that. Do not stop at other places. If the children are interested in other places, go to these other places on another field trip.

The children will get too tired if you try to do too much. A well planned field trip of one hour is long enough. Special trips using a long bus trip may take longer.

What does the class do after the field trip?

You might discuss the field trip in class the same day. Maybe you will have to wait until the next day to discuss the field trip.

Let the class write a "thank you" letter to the people at the place you visited and the bus driver.

The real classroom is outside.

A BEACH FIELD TRIP

Read the suggestions given in "How To Take A Field Trip". "A Beach Field Trip" gives special suggestions that you can use if the field trip is to the beach.

Suggestions:

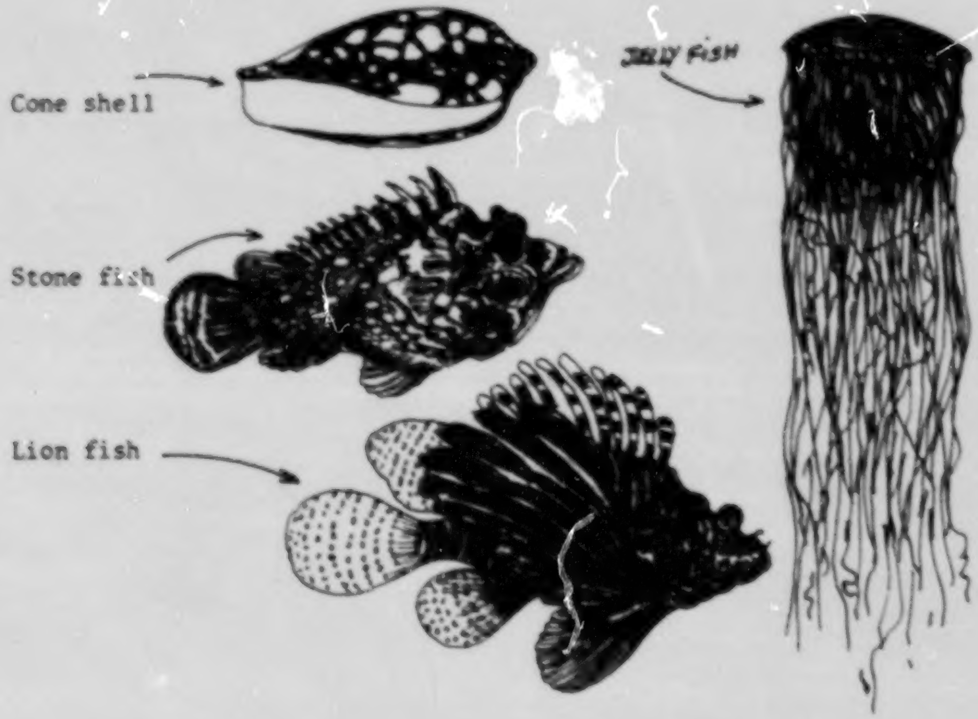
Take another adult (parent or teacher) with you on the field trip.

Be sure the beach you are going to is safe for children.

Be sure the children know what part of the beach they can go to. Set the boundaries.

Decide who can go into the water. Decide how far they can go into the water. Never let the children get into water that is over their heads. Someone should always be watching anyone in the water.

Be sure the children know which organisms are poisonous.



Don't scare the children when talking about the above organisms. They should know not to touch such organisms.

Know what you are going for. Only bring back what you need. Don't bring back 50 fish if you have a small aquarium. Maybe only 10 fish would live in the small aquarium. Conserve the organism.

Always put back any object moved. For example: If you pick up a rock to look under it, put it back exactly into the some place.

Do not destroy coral. Only bring back living coral if you are going to look at it. Then, only bring back a little piece. Do not let the children break off pieces of coral without a good reason. Conserve the coral.

Don't litter at any time during the trip.

The children will have many ideas on how to catch organisms. For example:

Use a piece of screen for a net.

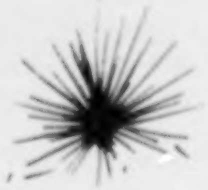
Put some seaweed in a bucket. Carefully look through it to find the animals hiding in it.

Leave hollow tubes for the fish to hide in. Then come back and empty them into a container.

Look for small pools of water (tide pools) that have organisms trapped in them. Use a small net to get them out.

DO NOT BRING BACK TOO MANY ORGANISMS. ONLY BRING BACK WHAT CAN LIVE IN YOUR AQUARIUM. YOU CAN ALWAYS COME BACK TO THE OCEAN AND GET MORE OR DIFFERENT ORGANISMS. DON'T TAKE ORGANISMS OUT OF THE OCEAN UNLESS YOU ARE GOING TO USE THEM.

If possible the children should wear something on their feet. It is dangerous and painful to step on sea urchins, stonefish, or sharp coral in bare feet. Wearing shoes or zores is safer.



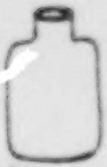
sea urchin

HOW TO SET UP A SALTWATER AQUARIUM

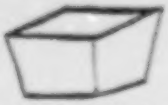
This Teacher Aid gives suggestions to setting up and maintaining a saltwater aquarium. You can use it as a reference according to your needs.

What kind of an aquarium tank is needed?

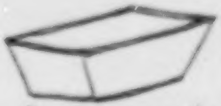
You could use any kind or size of clear plastic or glass container.



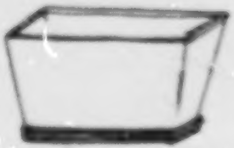
gallon jar



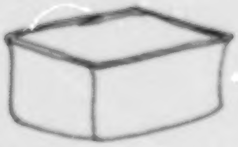
1 gallon plastic aquarium



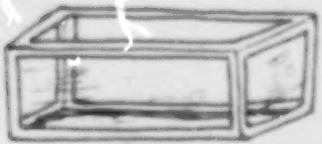
2 gallon plastic aquarium



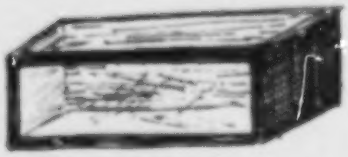
aqua-flaire plastic aquarium
3 or 10 gal.



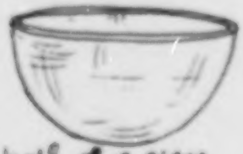
glass or plastic aquarium
1 gal. to 4½ gal.



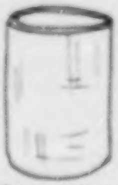
metal framed glass aquarium. 2 gal. to 100 gal.



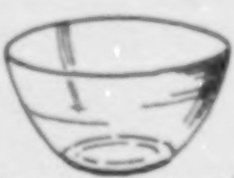
fiberglass aquarium with glass window
7 to 75 gal.



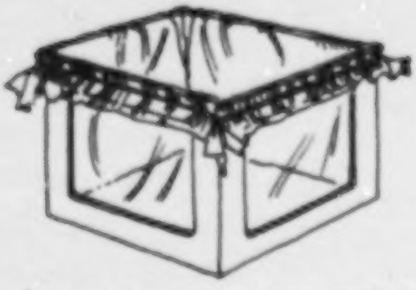
half of a glass ball aquarium (fishing float)



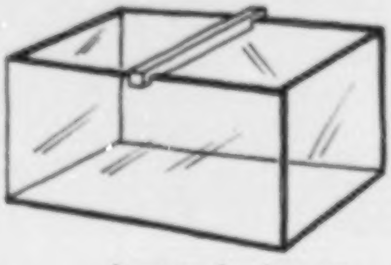
glass aquarium
¼ gal. to 3 gal.



transparent bowl
½ to 1 gallon



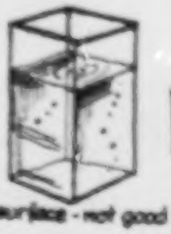
homemade cardboard or wooden lined with heavy, clear, flexible plastic (polyethylene)

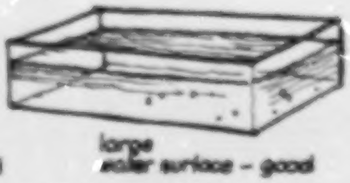


homemade glass or plexiglass aqarvim

Do not use a container where the saltwater touches the metal parts. The metal interacts with the saltwater.

The besk kinds of tanks are shaped to allow a lot of air to touch the top of the water. The more water surface open to the air, the better the aquarium.



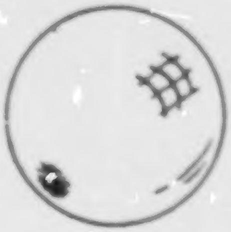


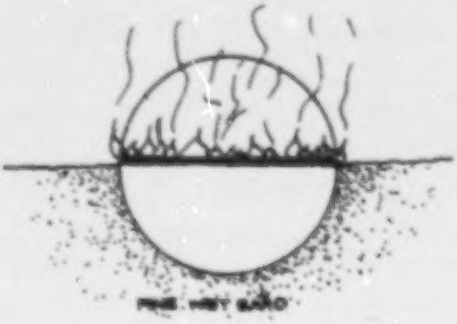
Can I build my own aquarium tank?

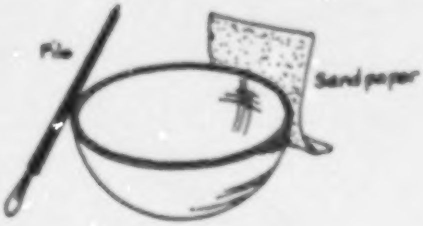
Yes. Here are some examples of aquariums you could make yourself (homemade).

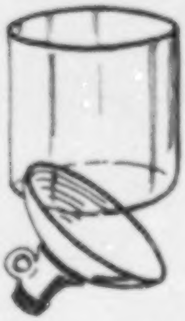
Example #1 Half a glass ball or a glass jar aquarium.

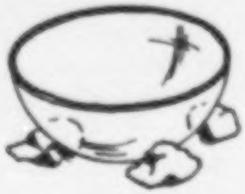
1. Use a large glass ball (fishing float) or a glass gallon jar.
2. Dig a hole in the ground or sand. Place the ball or jar in the hole like in the picture.
3. Wet the sand. Do not wet the top part of the ball or jar.
4. Soak a string with gasoline or kerosene. Wrap a string around the place you want the glass to break. Wrap it three times if it is thin string.
5. Light the string. The heat should bring the glass where the string is.
6. You can make the glass edges smooth with a file or sandpaper. You could put tape, old hose, or inner tube over the sharp edges.
7. You could put rocks or clay around the bottom of the half glass ball to make it stay up.



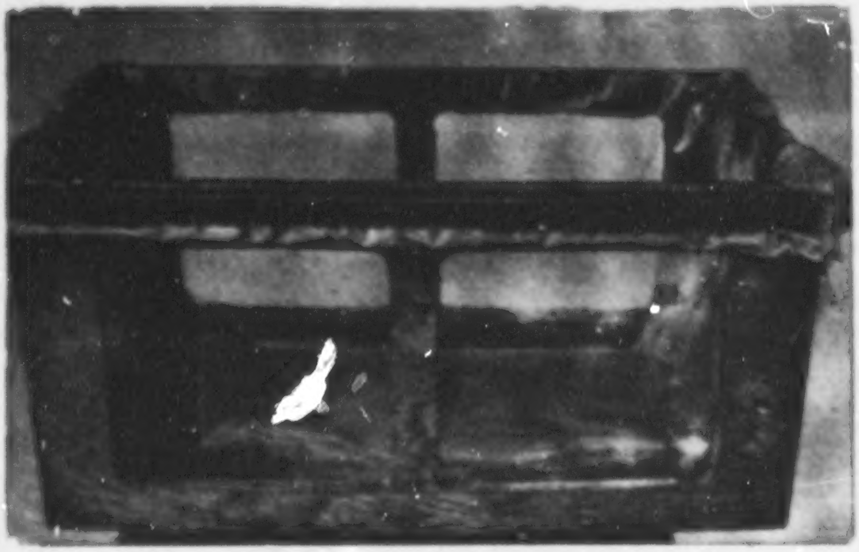








Example #2 An aquarium made from a box lined with plastic.



1. Make a wooden box or use a heavy cardboard box.

2. Cut windows in the box. Do not cut too many windows in a cardboard box. Water is very heavy and the box must stay strong.

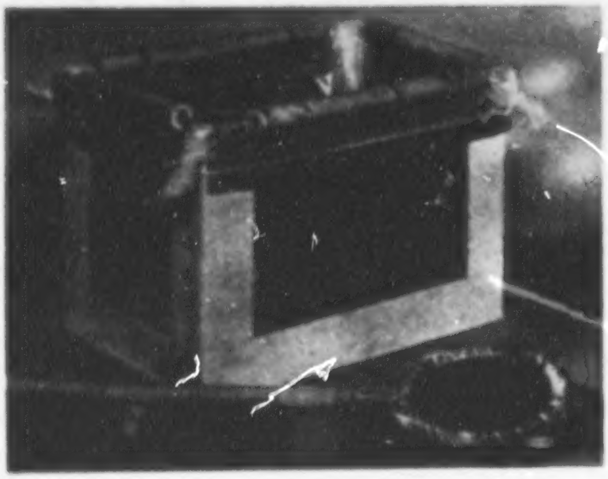
3. Put the plastic inside the box. This must be the heavy, clear, flexible plastic. It is called polyethylene plastic.

   Make sure the plastic is tight against the bottom and sides of the box.

4. Hold the plastic to the top of a wooden box with small pieces of wood and small nails.

   Hold the plastic to the top of a cardboard box by putting the plastic over the flaps that made the top of the box. Tie the plastic on the corners. Then fold the flaps down and tie them.

   You could also slit short pieces of bamboo. Place them around the top of the box to clamp the plastic.



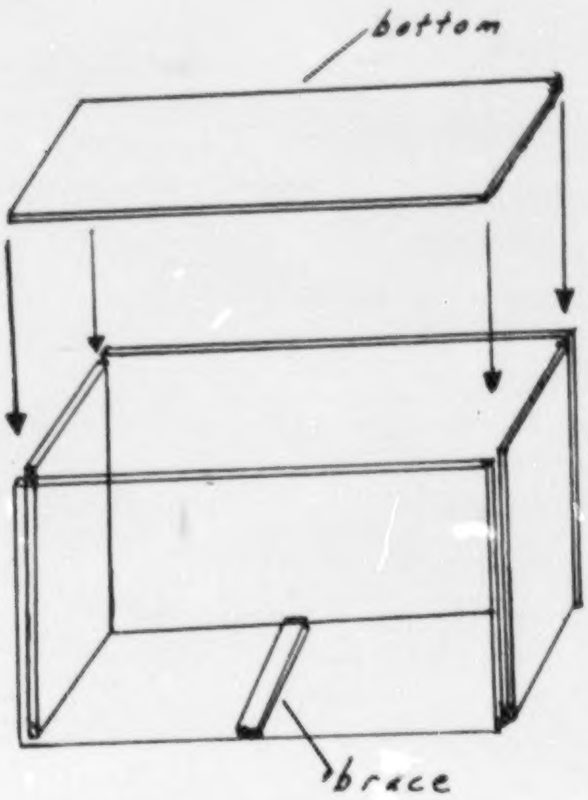
5. Before you put water in the aquarium, put the aquarium in the place you want it. Do not try to move the aquarium after you fill it with water.

6. If the water is too heavy for a cardboard aquarium, put pieces of wood around it. This will help hold it together.

Example #3 An Aquarium made from glass-small sizes to fifty gallon sizes.

1. Cut all glass parts. Sand off rough edges. 2/8 inch glass works well.

2. Put Silastic (a silicon material in a tube) on the edges of the glass for the aquarium sides. Press the side pieces together. You can hold the sides together with miter clamp of braces made from wood. Use the Silastic to add the brace. The aquarium is now upside down.



3. Put Silastic along the edges where the bottom will fit. Place the bottom down on the sides.

4. Remove any Silastic you smeared because it is very difficult to remove after it dries.

   Let the aquarium set until the Silastic is completely dried (24 hours).

5. After the tank is dry it can be moved anywhere. Do not move it with water in it.

6. Add another coat of Silastic to the seams inside. This is to make sure it doesn't leak.

7. The aquarium is ready to use.

Example #4 An aquarium made from plexiglass-small sizes to fifty gallons.

Aquariums can be made of plexiglass (lucite) like the glass one in example #6. The parts are joined together by soaking the contact area in chloroform. The soaked areas are then put together and clamped.

Aquariums made this way are excellent. Directions for making them are complex. It is best to contact someone who has constructed one to learn how to do it.

Is an air pump needed?

If you wish to keep many organisms more than one day, you will need an air pump.

You can put a few small organisms into larger aquariums for one day without a pump.

On page 126 there are suggestions on how to keep organisms without using an air pump.

What kind of an air pump is needed?

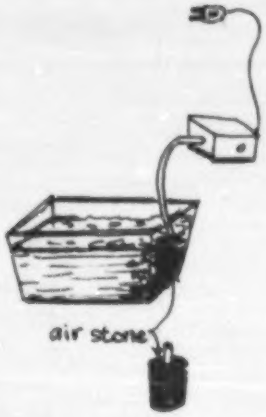
Any kind will work. It is better to have a large air pump in a large (ten gallon or more) aquarium.

You could use a battery operated pump if your school does not have electricity. This pump is made to run off one or two flashlight batteries. One battery will keep the pump running for about eight hours. You will need several batteries each day.

Is a filter needed?

You can use an airstone in small aquariums for a couple days. This will put air into the water, but it will not filter (clean) the water.

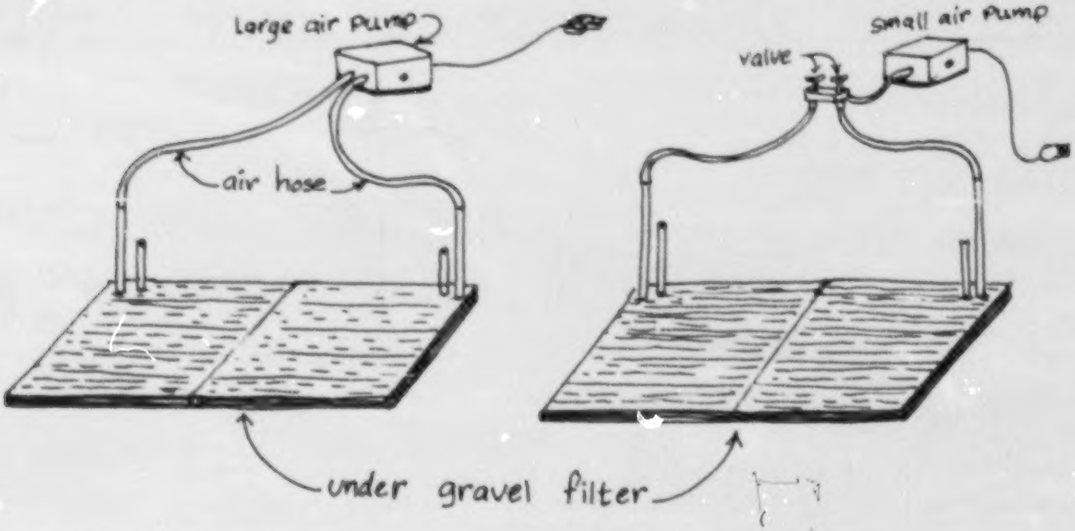
You will need a filter in larger aquariums and in aquariums you keep more than a week. The filter puts air into the water and filters (cleans) the water.



What kind of filter is needed and how is it hooked up?

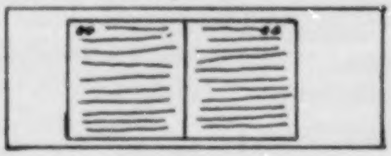
Below are several kinds of filters hooked up to air pumps.

UNDER GRAVEL FILTER


large air pump
air hose
valve
small air pump
under gravel filter

Put the under gravel filter on the bottom of the aquarium.

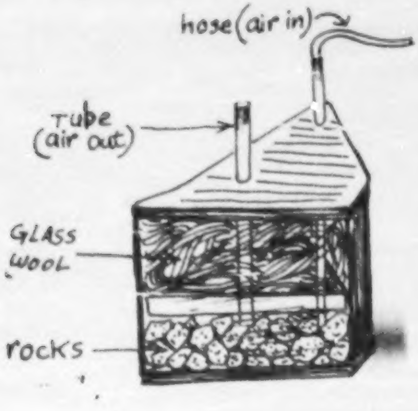
The filter should cover about 2/3s of the bottom of the aquarium.



Connect the air hoses from the filter to the pump. You might use a valve.

Put two inches of gravel on top of the filter. Do not use sand.

INSIDE CORNER (BOTTOM) FILTER


hose (air in)
Tube (air out)
GLASS WOOL
rocks

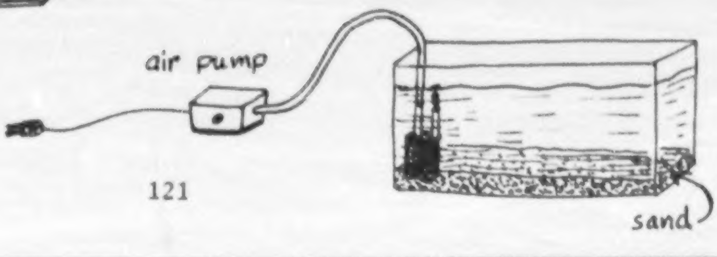
Put small rocks in the filter.

Put the glass wool in the filter.

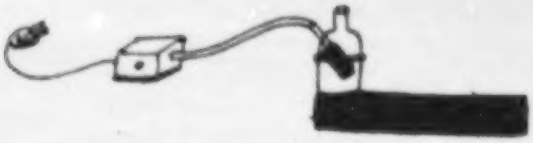
Put the filter together. Put it in the corner of the aquarium.

Connect the air hose from the filter to the pump.

Put sand or gravel on the bottom of the aquarium.


air pump
sand

INVISIBLE FILTER

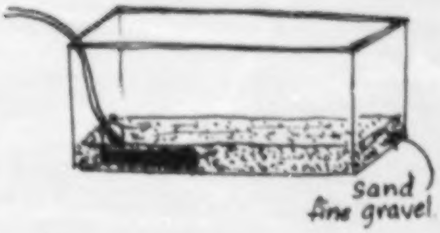


Put the filter together.

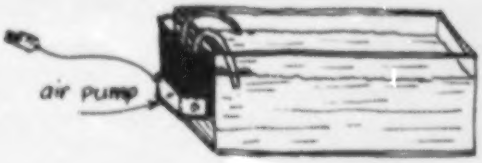
Connect the air hose from the filter to the pump.

Put the filter on the bottom of the aquarium.

Cover it with one inch of sand or fine gravel.

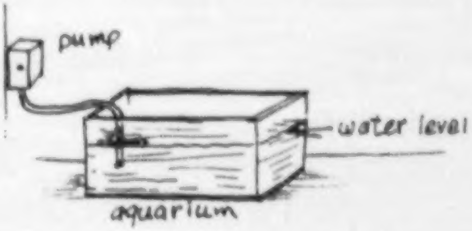

sand
fine gravel

OUTSIDE FILTER



These filters are not all the same. Follow the directions that come with your filter.

These filters bring the water outside the aquarium to filter (clean) it.


pump
water level
aquarium

Where should the pump be placed?

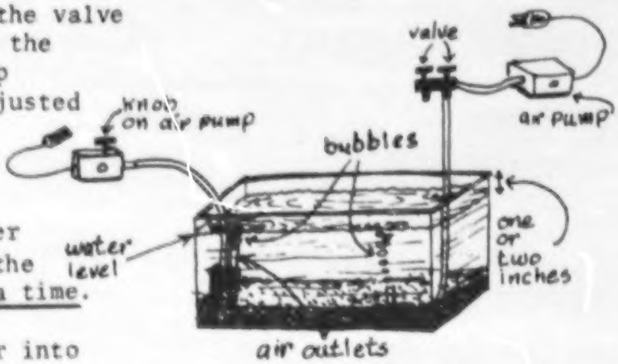
Put it above the level of the water in the aquarium if you can.

Which filter is best?

The undergravel and Invisible filters are best for an aquarium that is large and that you keep for a long time. These filters allow small organisms to live in your aquarium and you do not have to clean these filters.

How fast should the air bubbles come out of the filters?

Turn the knob on the air pump or the valve until the bubbles come up through the water one at a time. The air pump should not make noise if it is adjusted correctly.


valve
knob on air pump
bubbles
air pump
water level
one or two inches
air outlets

The bubbles break the surface of the water. This helps oxygen enter the water. This works best when the bubbles go to the surface one at a time.

It is possible to put too much air into the water. If this happens the fish do not get enough oxygen because there is too much of another gas (nitrogen) in the water.

How much saltwater should you put in an aquarium?

Fill the aquarium to one or two inches from the top. The water must cover the air outlets on the filters.

How much sand or gravel should you put in an aquarium?

Put in about two inches of fine gravel if you are using an under gravel filter or the invisible filter.

Put in one or two inches of sand or gravel with the other filters.

Should the aquarium be covered?

Never cover the aquarium completely. Only cover half the top.

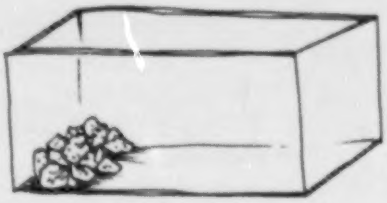
Air must contact the surface of the water. The oxygen from the air goes into the water. The carbon dioxide leaves the water and goes into the air.

The aquarium should always get lots of air over the top of the water.

Should rocks be put in an aquarium?

Yes, a pile of rocks in one corner of the aquarium is good because:

organisms can hide in it,
organisms can hold onto it,
it can hold down corner filters.



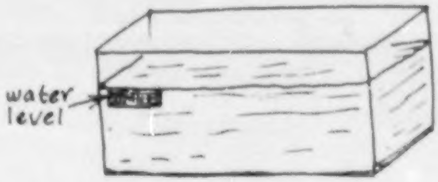
Where should the saltwater come from?

Any place in the lagoon or ocean where it is clean. Do not use water from a place that is dirty or polluted.

What should be done when the water level goes down?

You should mark the water level with a piece of tape. Then you can tell when it goes down.

When the saltwater evaporates, the water leaves and the salt stays. You only need to replace the water, not the salt.



When the water level goes down, put aged tap water or rain water into the aquarium until it is up to the water level again.

Where should the aquarium be placed in the room?

Do not put it where it will get direct sunlight. This would heat up the water and kill some organisms.

Put it where the students can observe it easily. Put it where it is safe.

What makes the aquarium smell bad and the water turn colored?

Live coral usually lives a couple days. When it dies and decays it will poison the other organisms. Only leave live coral in a few days.

Watch organisms closely. It is hard to tell when they die. Remove them before they decay.

Some sea urchins seem to give off a poison which kills other organisms in the aquarium.

You may have too many organisms in the aquarium. They will die because there is not enough air for all of them.

What do you do if the aquarium smells bad and the water is colored?

If this happens, check the following:

Is the filter clean?
Is the pump working?
Is there a dead organism in the aquarium?
Is there extra food laying in the aquarium?

Fix the filter and pump. Remove the old food and dead organisms. See if the water will get clear again in a couple days.

If the water does not clear and stop smelling, you will have to clean it. Do the following:

Remove all the sand, gravel, rocks and water before moving it.
Wash the aquarium. Do not use soap or any other chemical.
Start it over again.

What can you feed the organisms in the aquarium?

The organisms in your aquarium may eat many different things. Below are some suggestions. Whatever food you use, do not use too much. Remove any food that is not eaten after two hours. If you put in too much it will decay and poison the organisms.

Commercial fish food
Small pieces of fish, shrimp, crabs or clams
Brine shrimp eggs
Ocean plants ,pieces of lettuce

Experiment to see which food each organism eats. You do not have to feed them every day. Once or twice a week is enough for most organisms.

Should the aquarium get light?

The aquarium should get a lot of light. Place it where it will get light.

Do not put the aquarium in direct sunlight. This makes the water too hot and may kill the organisms.

Light keeps the fish healthy.

Light helps the algae grow. Many organisms use this algae for their food. It is a food you can grow in your aquarium.

Some schools have electric lights for aquariums. They make it easy to see into the aquarium. They could be used but:

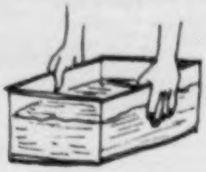
> do not leave them on at night, be very sure the light will not fall into the water (this could be very dangerous).

Electric lights are not very important if your class gets a lot of indirect sunlight.

What makes aquariums crack, break and leak?

Water and sand are very heavy. The aquarium will crack and/or leak if you move it with sand or water in it. Always take all the sand, gravel, rocks and water out before you move an aquarium.

You can move the one gallon plastic aquariums with the water if you hold them like in the picture. Do not twist them.



What can I do if my glass aquarium leaks?

If the glass is broken you will have to replace the broken piece. For this you will need aquarium cement and glass of the correct thickness.

If the glass is not broken, try the following:

> Slowly fill the aquarium up with warm water. This will make the sealer soft and it might reseal.
>
> OR
>
> Clean and dry the aquarium. Put Silastic or other types of aquarium sealer on all the inside joints.

What can I do if my plastic aquarium leaks?

Some aquariums can be sealed by brushing a little bit of chloroform on the crack. This will dissolve the plastic and seal it as it dries.

You can brush polyester resin over the cracks. This resin can be bought from Sears or places that have fiber glass for boats. Large cracks or holes can be repaired by using fiber glass cloth with the resin.

Some teachers have repaired the small plastic aquariums with a glue they made from styrofoam (packing material) and gasoline. This could be poisonous to the fish and you should experiment with it before using it too much.

Can I have a saltwater aquarium without any air pump?

Yes, but you will have to experiment to see what will work for you. Here are some suggestions for keeping an aquarium without an air pump:

1. Use a large aquarium and a small number of organisms.

   OR

   Use a small aquarium and only one or two small organisms.

2. Keep the aquarium uncovered.

3. Get your organisms from the tide pool areas on or close to shore. These organisms are better adapted to a severe and changing environment.

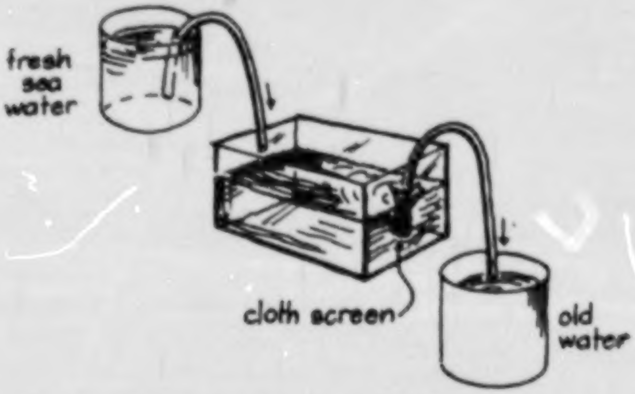
4. Only plan to use the aquarium for a short time. For example, observe the organisms for a week and then set up a new aquarium with different organisms.

5. Observe organisms other than fish. Many other organisms are interesting for an aquarium. For example, put in sea shells, or crabs, or sea urchins, or small starfish. Many of these organisms will live under environmental conditions that kill fish.

6. You could try keeping more delicate organisms in an aquarium by changing the water each day.

   Use two siphon hoses. Put a cloth screen over the end of the hose that will siphon the water out of the aquarium. The screen will stop any organisms from being sucked out.

Siphon new water into the aquarium as after you siphon almost all of the old water out of the aquarium.


fresh sea water
cloth screen
old water

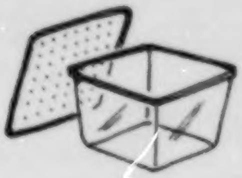
This requires a lot of work and attention. It might be worth doing for a short time, like one school week.

Try several aquariums and see what happens. The best advise to follow is:

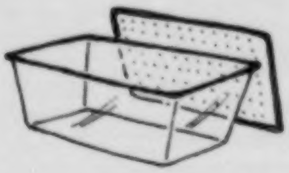
USE LOTS OF WATER AND ONLY A COUPLE ORGANISMS.

TERRARIUMS

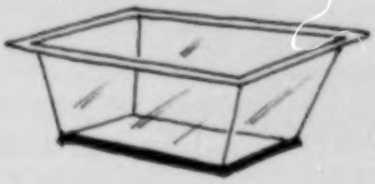
Below are examples of different kinds of terrariums. Some are commercial and some you can make yourself. The kind of terrarium you need depends on what you want to do.



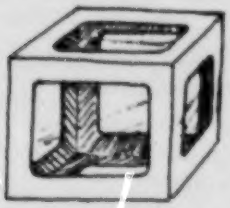
one gallon aquarium used as a terrarium



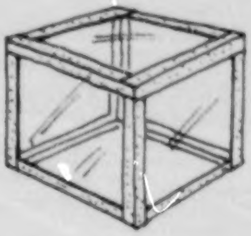
two gallon terrarium



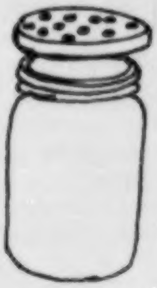
larger aquarium used as a terrarium



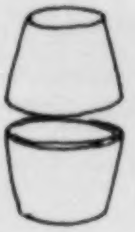
overhead transparency terrarium made from six mounted overhead transparencies



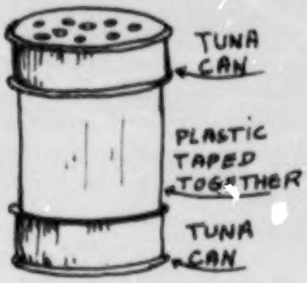
six pieces of glass or plastic taped together or glued together with Silastic



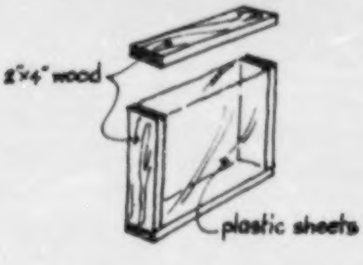
large jar with a lid or screen over the top



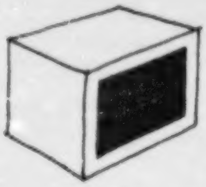
plastic cups taped together



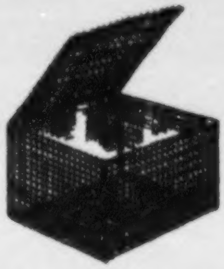
cans and plastic or cans and screen



wood frame and plastic sides-good for ant farms



box with screen



screen or fine wire fence made into a cage

POPULATIONS MATERIALS NEEDED FOR ONE CLASSROOM FOR ONE YEAR
(Based on 32 students per class)

		1	1A	2	3	3A	4	5	6	7	8	9	10	10A	10B	11	11A	12	13	14	Total
KIT-RETURNABLE	aquarium-1 gal.	10			2	4		8			8		8	8							16
	aquarium lid							8			8										8
	magnifier	32			32	32	32		32	32	32			32							32
	net-small	2	2																		2
	medicine droppers				16																16
	invisible filter-size 4		1																		1
	aquarium pump		1																		1
	aquarium tubing		1																		4 ft.
	air valve (2 way)		1																		1
	aquarium-15 gal. fiber glass or aquarium-10 gal. AquaFlair		1																		1
KIT-CONSUMABLE	student worksheets			32			32			32	32	32				✓60					*
	plastic bags										10		*								1 pkg.
	seeds-Chinese cabbage																				*
	cotton										*										½ pkg.
	yeast					*					*										*
	brine shrimp					*															*
SCHOOL/TEACHER	masking tape	*	*	*	*	*	*	*			*	*	*	*		*					*
	paper towels						*				*										*
	paper-ditto	*	*	*	*	*		*				*	*	*		*		*	*		*
	paper-chart						1														*
	paper-construction							*													*
	jars-small(baby food) with lids				32	32	32		*		16		*	32							32+
	jars-medium	8	*		10		2	*					*								10
	sand	*	*											*							*
	soil					*		*													*
	string												*	*					*		*
	crayons											*				*					
	scissors															*					*